A NOVEL OF THE FUTURE COMPLETE IN THIS ISSUE

STARTLING STORIES

NOV.

15¢

A THRILLING PUBLICATION

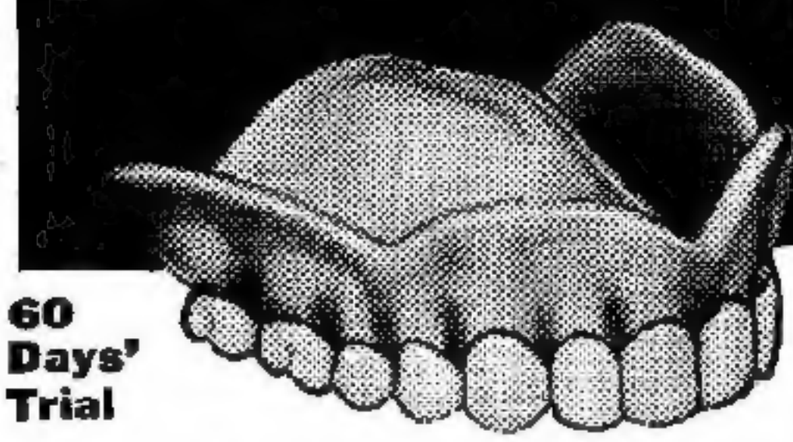
THE FORTRESS OF UTOPIA
By JACK WILLIAMSON

A MARTIAN ODYSSEY By STANLEY G. WEINBAUM

Enjoy BEAUTIFUL Natural-Looking FALSE TEETH

LOWEST PRICES

SEND NO MONEY



60 Days' Trial

Mouth Comfort!

ELSIE E. BOLAND, Norton, Kansas, writes:

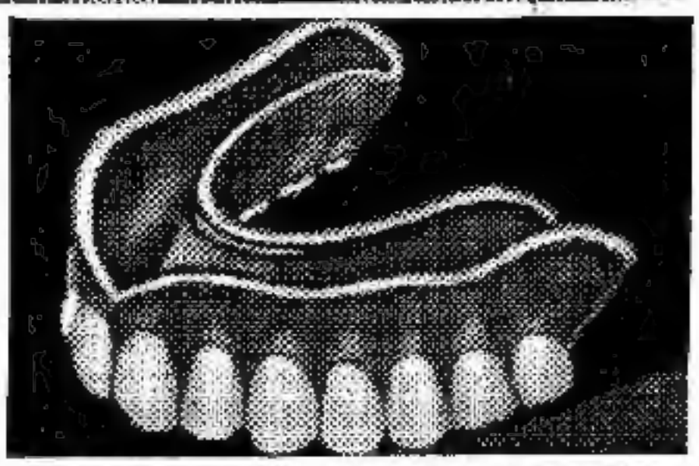
"Enclosed find two pictures. One shows how I looked before I got my teeth; the other one, afterwards. Your teeth are certainly beautiful. They look more natural than some that cost three and four times what I paid for mine."

MRS. MARTHA A. WEBB, Jacksonville, Florida, writes: "My plate is not only a perfect fit, but a beautiful piece of work. I took my own impression under your instructions without the least difficulty. I could not have duplicated my plate here for less than four times the price you charged me."

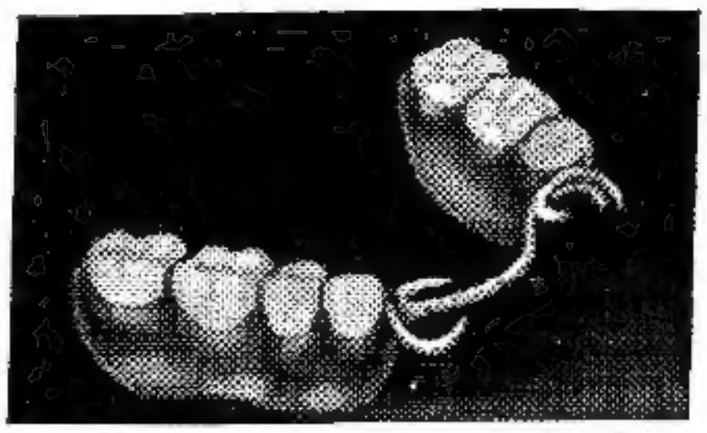
MR. RAYMOND MILLS, Elgin, Illinois, writes: "It affords me great pleasure to inform you that I have experienced no difficulty in using this plate with comfort and without the assistance of any dental adhesive. I am now able to masticate different varieties of food, as well as raw apples and hard candy, just as well as I did with my natural teeth. During the trial period, not a single sign of gum soreness developed."

FIT-RITE TEETH BY MAIL

We make to measure to fit you individually—BY MAIL—the World's No. 1 FIT-RITE Dental Plates for men and women—from an impression of your own mouth taken quickly and easily by our FIT-RITE improved method. We have thousands of enthusiastic satisfied customers all over the country wearing teeth we made by mail at sensible prices.



UNBREAKABLE ROOFLESS



UNBREAKABLE PARTIAL

AT ROCK-BOTTOM PRICES

If you find out what others have paid for theirs, you will be astounded when you see how little ours will cost you! By reading our catalog, you will learn how to save half or more on dental plates for yourself. Monthly payments possible.

ON 60 DAYS' TRIAL

Make us prove you can't beat our fit, work or price. Wear our teeth on trial for as long as 60 days. Then, if you are not perfectly satisfied with them, they will not cost you a cent.

With Money-Back Guarantee of Satisfaction

No money need be risked. We guarantee that if you are not completely satisfied with the teeth we make for you, then any time within 60 days we will immediately refund every cent you have paid us for them. We take your word.

Try FIT-RITE False Teeth TO EAT WITH PLEASURE . . . TO LAUGH HEARTILY . . . TO LOOK YEARS YOUNGER . . . TO GUARD YOUR HEALTH . . . TO SPEAK DISTINCTLY . . . TO ENJOY LIFE!

OUR dentures are set with life-like, pearly-white, genuine, porcelain teeth; constructed from finest materials, with expert workmanship, to give life-long service. We make all styles of plates. A dentist who has had many years' experience in making and fitting dental plates, that look right and fit right supervises the making of each plate.

MAIL THIS COUPON NOW

FREE UNITED STATES DENTAL COMPANY

Dept. E-82, 1555 Milwaukee Ave.
CHICAGO, ILLINOIS

Send, without obligation, your FREE impression material, catalog, and easy directions.

NAME .....

ADDRESS .....

(Print Clearly)

FREE IMPRESSION MATERIAL, catalog with new low prices and easy directions. Don't put this off. Do it TODAY! CLIP COUPON OR WRITE.

Nowhere Else Can You Obtain Genuine FIT-RITE False Teeth

We Also Repair or Reproduce Old Plates—48-Hour Service

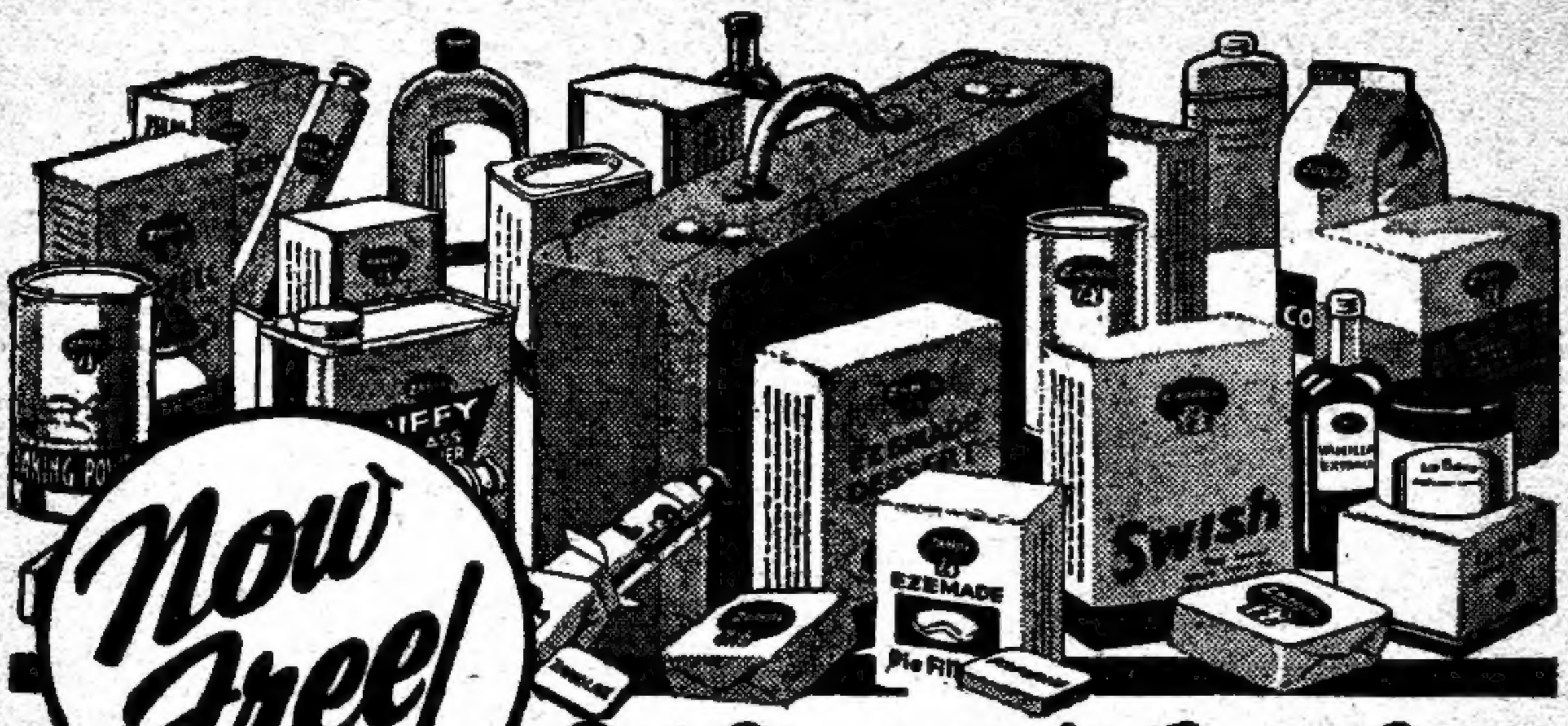
UNITED STATES DENTAL COMPANY

THE WORLD'S LARGEST LABORATORY MAKING DENTAL PLATES ONLY

DR. G. M. COLLINS, CHIEF OF STAFF

1555-1557 MILWAUKEE AVE., DEPT. E-82, CHICAGO, ILLINOIS

THIS BIG MONEY-MAKING OUTFIT...



Get Started At Once On a Fine Paying FOOD ROUTE

How would you like to have a fine-paying business of your own—a simple-to-run Food Route on which you can start making good money your very first day? Here's your big chance if you act now. To an honest, reliable man or woman in any open locality, I will give—FREE—complete business equipment containing absolutely everything needed to run a fine-paying neighborhood Food Route. **You don't send me a penny.** If you want to better yourself—want cash to spend—money to save—the means to live in comfort—let me show you your big chance.

Without any previous experience, you can now own a simple, pleasant, dignified Food Route—a profitable all-year 'round business of your own, in which your home is your headquarters. No training course required.

Be a Food Distributor

The complete valuable Display Outfit which I give you FREE is absolutely all you need to run a fine-paying neighborhood Food Route. And I am willing to extend liberal credit so you can build a splendid business on my capital.

Food Distributors make good money because they handle daily necessities that people simply must buy. You will distribute our guaranteed, uniform high quality products fresh from our own pure food kitchens and laboratories. You will make calls on your list of regular customers, take orders, make deliveries, and pocket a liberal share of every dollar you take in.

Splendid Cash Profits

You owe it to yourself to write and see what wonderful success so many others have enjoyed with this simple money-making Plan. Let me mail you full particulars — then you can judge whether you want to start right in making money at once. You can devote your full time or part time.

Everything You Need —FREE

I will give you FREE a complete valuable Display Outfit, including a big assortment of regular full-size packages. Without your sending me one penny, I will also give you a simple-sure-fire Plan which anyone can follow. I will give you advertising material and positively everything else you need to make good profits your very first day. I will help you every step of the way.

In addition to your fine cash earnings, you can get food products and over one hundred other daily household necessities for your own use at wholesale price—so you save money as well as make money.

Get Full Particulars —NOW!

This is a sincere offer made by a big, reliable, old-established company operating from Coast to Coast. Write at once for full particulars. Unless you take advantage of my remarkable Free Outfit Offer now, you may be missing the very money-making opportunity you have been looking for. Strike out for yourself! Be independent! Make money! Enjoy life! Remember—you don't send me a penny. Just fill out and send the coupon and I will mail you full particulars. Do this TODAY!

E. J. MILLS, President
7974 Monmouth Ave., Cincinnati, O.

MAIL COUPON for Full Details of FREE OFFER

E. J. MILLS, President,
7974 Monmouth Ave., Cincinnati, Ohio.

Without the slightest obligation on my part, please mail me full particulars about your offer of a Complete Free Outfit, so that I can start making money at once on a Local Food Route of my own.

Name.....

Address.....

.....

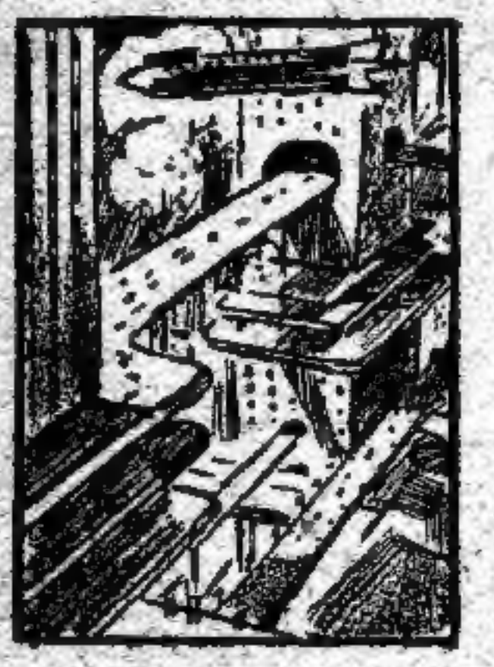
(Please print or write plainly)

★ THE BEST IN SCIENTIFICTION ★

STARTLING STORIES

Vol. 2, No. 3 CONTENTS November, 1939

A Complete Book-Length Scientifiction Novel



THE FORTRESS OF UTOPIA

By JACK WILLIAMSON

On a Lifeless Mystery Satellite, Five Lone Mortals Summon Secret Forces of the Citadel of Science to Free the Earth from the Doom of the Dark Nebula! - - - 14

Other Unusual Stories

THEY CHANGED THE WORLD . . . . . Jack Binder 90
A True Picture-Story of the Life of Heinrich R. Hertz
THREE WISE MEN . . . . . Lloyd Arthur Eschbach 92
A Time-Traveling Machine Explodes on a Millionaire's Doorstep
A MARTIAN ODYSSEY . . . . . Stanley G. Weinbaum 106
A Scientifiction Hall of Fame Story

Special Features

MEET THE AUTHOR . . . . . Jack Williamson 13
GUEST EDITORIAL . . . . . Ralph Milne Farley 89
THRILLS IN SCIENCE—Thumbnail Sketches . . . . . Mort Weisinger 102
SCIENCE QUESTION BOX . . . . . Questions and Answers 113
THE ETHER VIBRATES . . . . . Announcements and Letters 114
SCIENTIFIC CROSSWORD PUZZLE . . . . . A Brain-Teaser 116
REVIEW OF SCIENCE FICTION FAN PUBLICATIONS . . . The Editor 126

STARTLING STORIES, published bi-monthly by Better Publications, Inc., N. L. Pines, President, at 4600 Diversey Ave., Chicago, Ill. Editorial and executive offices, 22 West 48th St., New York, N. Y. Entered as second class matter September 29, 1935, at the post office at Chicago, Illinois, under the act of March 3, 1879. Copyright, 1939, by Better Publications, Inc. Yearly $.90, single copies $.15; foreign and Canadian postage extra. Manuscripts will not be returned unless accompanied by self-addressed stamped envelope and are submitted at the author's risk. Names of all characters used in stories and semi-fiction articles are fictitious. If a name of any living person or existing institution is used, it is a coincidence.

Companion magazines: Thrilling Wonder Stories, Strange Stories, Popular Western, Thrilling Mystery, Thrilling Western, Thrilling Detective, Thrilling Adventures, Thrilling Love, The Phantom Detective, The Lone Eagle, Sky Fighters, Popular Detective, Thrilling Ranch Stories, Thrilling Sports, Popular Sports Magazine, Range Riders, Texas Rangers, Everyday Astrology, G-Men, Detective Novels Magazine, Black Book Detective Magazine, Popular Love, Masked Rider Western Magazine, and West.

I jumped from $18 a week to $50
--a Free Book started me toward this GOOD PAY IN RADIO

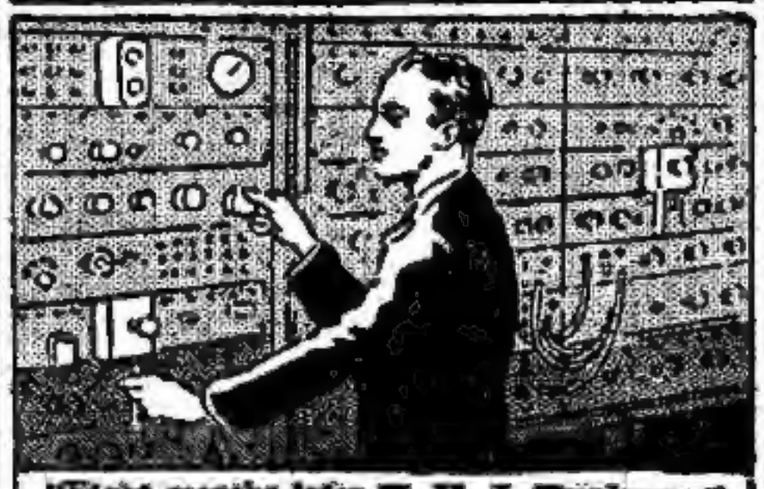
HERE'S *How it Happened*

by S. J. E.
(NAME AND ADDRESS SENT UPON REQUEST)

"I had an $18 a week job in a shoe factory. I'd probably be at it today if I hadn't read about the opportunities in Radio and started training at home for them."

"The training National Radio Institute gave me was so practical I was soon ready to make $5 to $10 a week in spare time servicing Radio sets."

"When I finished training I accepted a job as serviceman with a Radio store. In three weeks I was made service manager at more than twice what I earned in the shoe factory."



"Eight months later N. R. I. Employment Department sent me to Station KWCR as a Radio operator. Now I am Radio Engineer at Station WSUI. I am also connected with Television Station W9XK."

"N. R. I. Training took me out of a low-pay shoe factory job and put me into Radio at good pay. Radio is growing fast."

Find out today how I Train You at Home to BE A RADIO TECHNICIAN

J. E. SMITH, President
National Radio Institute
Established 25 Years

RADIO IS A YOUNG, growing field with a future, offering many good pay spare time and full time job opportunities. And you don't have to give up your present job to become a Radio Technician. I train you right at home in your spare time.

Why Many Radio Technicians Make $30, $40, $50 a Week

Radio broadcasting stations employ engineers, operators, station managers. Radio manufacturers employ testers, inspectors, foremen, servicemen in good-pay jobs. Radio jobbers, dealers, employ installation and service men. Many Radio Technicians open their own Radio sales and repair businesses and make $30, $40, $50 a week. Others hold their regular jobs and make $5 to $10 a week fixing Radios in spare time. Automobile, police, aviation, Commercial Radio; loudspeaker systems, electronic devices are other fields offering opportunities for which N. R. I. gives the required knowledge of Radio. Television promises to open good jobs soon.

Many Make $5, $10 a Week Extra in Spare Time While Learning

The day you enroll, I start sending you Extra Money Job Sheets which start showing you how to do Radio repair jobs. Throughout your training I send plans and directions which have helped many make $200 to $500 a year in spare time while learning. I send special Radio equipment to conduct experiments and build circuits. This 50-50 training method makes learning at home interesting, fascinating, practical. I ALSO GIVE YOU A MODERN, PROFESSIONAL ALL-WAVE, ALL-PURPOSE SET SERVICING INSTRUMENT to help you make money fixing Radios while learning and equip you for full time work after you graduate.

Find Out What Radio Offers You

Act Today! Mail the coupon for my 64-page book, "Rich Rewards in Radio." It points out Radio's spare time and full time opportunities and those coming in Television; tells about my course in Radio and Television; shows many letters from men I have trained, telling what they are doing and earning. Read my money back agreement. MAIL COUPON in an envelope or paste on a penny postcard —NOW!

J. E. SMITH, President
Dept. 9M09, National Radio Institute
Washington, D. C.

MAIL NOW • Get 64 page book FREE

J. E. SMITH, President, Dept. 9M09,
National Radio Institute, Washington, D. C.

Dear Mr. Smith: Send me FREE, without obligation, your 64-page book "Rich Rewards in Radio" which points out Radio's opportunities and tells how you train men at home to be Radio Technicians. (Write Plainly.)

NAME..... AGE.....

ADDRESS.....

CITY..... STATE.....

A Money-Making Opportunity

for Men of Character

EXCLUSIVE FRANCHISE FOR

AN INVENTION EXPECTED TO REPLACE

A MULTI-MILLION-DOLLAR INDUSTRY

Costly Work Formerly "Sent Out" by Business Men Now Done by Themselves at a Fraction of the Expense

This is a call for men everywhere to handle exclusive agency for one of the most unique business inventions of the day.

Forty years ago the horse and buggy business was supreme—today almost extinct. Twenty years ago the phonograph industry ran into many millions—today practically a relic. Only a comparatively few foresighted men saw the fortunes ahead in the automobile and the radio. Yet irresistible waves of public buying swept these men to fortune, and sent the buggy and the phonograph into the discard. So are great successes made by men able to detect the shift in public favor from one industry to another.

Now another change is taking place. An old established industry—an integral and important part of the nation's structure—in which millions of dollars change hands every year—is in thousands of cases being replaced by a truly astonishing, simple invention which does the work better—more reliably—AND AT A COST OFTEN AS LOW AS 2% OF WHAT IS ORDINARILY PAID! It has not required very long for men who have taken over the rights to this valuable invention to do a remarkable business, and show earnings which in these times are almost unheard of for the average man.

EARNINGS

One man in California earned over $1,600 per month for three months—close to $5,000 in 90 days' time. Another writes from Delaware—"Since I have been operating (just a little less than a month of actual selling) and not the full day at that, because I have been getting organized and had to spend at least half the day in the office; counting what I have sold outright and on trial, I have made just a little in excess of one thousand dollars profit for one month." A Connecticut man writes he has made $55.00 in a single day's time. Texas man nets over $300 in less than a week's time. Space does not permit mentioning here more than these few random cases. However, they are sufficient to indicate that the worthwhile future in this business is coupled with immediate earnings for the right kind of man. One man with us has already made over a thousand sales on which his earnings run from $5 to $60 per sale and more. A great deal of this business was repeat business. Yet he had never done anything like this before coming with us. That is the kind of opportunity this business offers. The fact that this business has attracted to it such business men as former bankers, executives of businesses—men who demand only the highest type of opportunity and income—gives a fairly good picture of the kind of business this is. Our door is open, however, to the young man looking for the right field in which to make his start and develop his future.

Not a "Gadget"— Not a "Knick-Knack"—

but a valuable, proved device which has been sold successfully by business novices as well as seasoned veterans.

Make no mistake—this is no novelty—no flimsy creation which the inventor hopes to put on the market. You probably have seen nothing like it yet—perhaps never dreamed of the existence of such a device—yet it has already been used by corporations of outstanding prominence—by dealers of great corporations—by their branches—by doctors, newspapers, publishers—schools—hospitals, etc., etc., and by thousands of small business men. You don't have to convince a man that he should use an electric bulb to light his office instead of a gas lamp. Nor do you have to tell the same business man the idea that some day he may need something like this invention. The need is already there—the money is usually being spent right at that very moment—and the desirability of saving the greatest part of this expense is obvious immediately.

Some of the Savings You Can Show

You walk into an office and put down before your prospect a letter from a sales organization showing that they did work in their own office for $11 which formerly could have cost them over $200. A building supply corporation pays our man $70, whereas the bill could have been for $1,600! An automobile dealer pays our representative $15, whereas the expense could have been over $1,000. A department store has expense of $88.60, possible cost if done outside the business being well over $2,000. And so on. We could not possibly list all cases here. These are just a few of the many actual cases which we place in your hands to work with. Practically every line of business and every section of the country is represented by these field reports which hammer across dazzling, convincing money-saving opportunities which hardly any business man can fail to understand.

Profits Typical of the Young, Growing Industry

Going into this business is not like selling something offered in every grocery, drug or department store. For instance, when you take a $7.50 order, $5.03 can be your share. On $1,500 worth of business, your share can be $1,167.00. The very least you get as your part of every dollar's worth of business you do is 67 cents—on ten dollars' worth $6.70, on a hundred dollars' worth $67.00—in other words two thirds of every order you get is yours. Not only on the first order—but on repeat orders—and you have the opportunity of earning an even larger percentage.

This Business Has Nothing to Do With House to House Canvassing

Nor do you have to know anything about high-pressure selling. "Selling" is unnecessary in the ordinary sense of the word. Instead of hammering away at the customer and trying to "force" a sale, you make a dignified, business-like call, leave the installation—whatever size the customer says he will accept—at our risk, let the customer sell himself after the device is in and working. This does away with the need for pressure on the customer—it eliminates the handicap of trying to get the money before the customer has really convinced himself 100%. You simply tell what you offer, showing proof of success in that customer's particular line of business. Then leave the invention without a dollar down. It starts working at once. In a few short days, the installation should actually produce enough cash money to pay for the deal, with profits above the investment coming in at the same time. You then call back, collect your money. Nothing is so convincing as our offer to let results speak for themselves without risk to the customer! While others fail to get even a hearing, our men are making sales running into the hundreds. They have received the attention of the largest firms in the country, and sold to the smallest businesses by the thousands.

No Money Need Be Risked

In trying this business out. You can measure the possibilities and not be out a dollar. *If you are looking for a business that is not overcrowded*—a business that is just coming into its own—on the upgrade, instead of the downgrade—a business that offers the buyer relief from a burdensome, but unavoidable expense—a business that has a prospect practically in every office, store, or factory into which you can set foot—regardless of size—*that is a necessity* but does not have any price cutting to contend with as other necessities do—that business you control the sales in exclusive territory in your own business—*that pays more to some individuals who show many are made in a week and sometimes in a month's time*—if such a business looks as if it is worth investigating, *get in touch with us at once for the rights in your territory*—don't delay—because the chances are that if you do wait, someone else will have written to us in the meantime—and if it turns out that you were the better man—we'd both be sorry. So for convenience, use the coupon below—but send it right away—or write if you wish, but do it now. *Address*

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Name _____

Street or Route _____

Box No. _____

City _____

State _____

1937
1938
1939
1940

Now is the time!

Business is Searching . . . . . for YOU, if . . . .

RIGHT now, in many lines, there is a search for really *good* men—managers, leaders—men who can take charge of departments, businesses, branch offices, and get things humming.

As always, there are not enough ordinary jobs to go 'round—but rarely before, in the history of American business, has there been so much room at the *top!* And new jobs are being created by the business pick-up in many lines—jobs that pay splendidly and that open the way to lifetime success.

Ordinarily, there would be plenty of men to fill these jobs—men in junior positions who had been studying in spare time. But most men have been letting their training slide during these dark years of depression . . . "What's the use?"—You have heard them say. Perhaps there has been some excuse for sticking to any old kind of a job one could get the past few years—but the door is wide open for the man with ambition and ability *NOW!*

And don't let anyone tell you that "Opportunity Only Knocks Once"—that's one of the most untruthful sayings ever circulated. Opportunities flourish for *every* American every day of his life.

Far more to the point is to be ready—to be *prepared*—to make yourself *interesting* to the big-time employer—and LaSalle offers you a short-cut method of qualifying for opportunity jobs in accounting, law, traffic, executive management, and kindred occupations.

LaSalle Extension is 30 years old—averages over 30,000 enrollments a year—60 American firms each employ 500 or more LaSalle-trained men—surveys show that many LaSalle students attain 40% salary increase after graduation—10% of all C.P.A.'s in the U.S.A. are LaSalle-alumni.

Why not find out what LaSalle has done and is doing for men in *your* position? Send and get the facts; see what LaSalle can do for you, personally!

There's no question about it—business is picking up—jobs are looking for *men*—the time has come for you to *qualify* for prosperity. Mail this coupon today!

LASALLE EXTENSION UNIVERSITY
A CORRESPONDENCE INSTITUTION

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I am in earnest about my success and I would like to have your special booklet—without any cost or obligation to me—about my opportunities and your success training in the business field I have checked:

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- ☐ Higher Accountancy
- ☐ Traffic Management
- ☐ Modern Salesmanship
- ☐ Commercial Law
- ☐ Law—Degree of LL.B.
- ☐ Expert Bookkeeping
- ☐ Industrial Management
- ☐ Modern Foremanship
- ☐ Business Correspondence
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- ☐ Effective Speaking
- ☐ C. P. A. Coaching
- ☐ Stenotypy

Name.....*Age*.....

Position.....*Address*.....

Ask for one of these booklets—or a similar one on your own field of business. They are free!

Boys! Boys!

Mail Coupon

BIG PRIZES

OH, BOY! What a bike! A long, low, silvery beauty made of stainless, rust-proof aluminum alloy. Light in weight, yet stronger (weight for weight) than steel. Completely streamlined bow-arch frame, 19" high. Fully equipped with hornlite with side navigation lights, streamlined sprocket-wheel guard, coaster brake, luggage carrier, frame pump, and parking stand. A truly wonderful bike. Earn it, and any of 300 other prizes. Mail the coupon today.

I WISH I HAD SOME SPENDING MONEY
HERE'S MY CHANCE! I'LL MAIL THIS POST CARD!
BRING A MAGAZINE EVERY MONTH
NOW I HAVE MONEY AND A BICYCLE BESIDES!

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Mr. Jim Thayer, Dept. 905
The Crowell-Collier Publishing Co., Springfield, Ohio

Dear Jim: Start me earning MONEY and PRIZES at once.

Name..... Age.....

Address .....

City..... State.....

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NOW a DYNAMIC HEAVY DUTY INDUSTRIAL WELDER for Only $19.95 RETAIL

WORKS Off 110-Volt Light Socket. This marvelous Dynamic Power Welder does the work of much higher priced types. It is easily portable. WELDS Cylinder Blocks, Bumpers, Fenders, Tanks, Farm Machinery, etc. Will also solder and braze on the lightest material. Works on iron, steel, tin, brass, copper and all other metals. Men without previous experience can make as much as $5.00 on a one hour repair job. In a year's time a Dynamic-Welder COSTS YOU LESS THAN 6 CENTS A DAY

Go into business—Open a welding shop now. AGENTS—Make big profits selling to garages, factories, janitors and machine shops. Write today for our 10-DAY TRIAL OFFER. DYNAMIC WELDER COMPANY, 2226-HS SILVERTON ROAD, CHICAGO, ILLINOIS.

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WANTED AT ONCE! Mother, Home, Love, Patriotic, Sacred, Comic or any subject. Don't delay — send us your original poem today for immediate consideration.
RICHARD BROS., 74 Woods Bldg., CHICAGO, ILLINOIS

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By FREDERIC ARNOLD KUMMER, JR.

Plus a Full-Length Novel by
EANDO BINDER
Complete in a Special Section

AND MANY OTHER STORIES

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What Would It Mean To YOU To Get Up To $150.00 A MONTH?

Amazing New Policy

COSTS ONLY 3¢ A DAY

If sickness or accident should strike YOU—lay you up, disabled—stop your income, perhaps for months—don't face the additional worry of money for bills and expenses! Protect yourself and your loved ones with the remarkable low cost Sterling Sickness and Accident Policy! For only 3c a day this amazing policy provides ACTUAL CASH—to help pay bills and expenses! Pays you up to $150.00 a month for sickness, *including Hospital Benefits*; $100.00 a month for accident; pays as much as $2,500.00 for loss of limbs, sight, or accidental death, plus many other liberal benefits, as provided in policy.

Pays Cash For Common Sicknesses And All Types Of Accidents

This policy covers sicknesses common to men and women, covers all types of accidents as happen every day in or by automobiles or trucks, on street, at home, on the farm, in factory, while at work, etc. Benefits payable from FIRST DAY, as explained in policy.

MORE THAN $500,000.00 PAID

Young and old — men, women, children, ages 15 to 64 without Doctor's Examination — are eligible for this liberal insurance. More than $500,000.00 Cash Benefits already paid on Sterling Policies. Big, responsible, Legal Reserve Stock Company. $100,000.00 on deposit with State of Illinois Insurance Department for protection of all policy-holders.

EASY MONTHLY TERMS

Because we deal direct with you and have no agents, your cost of this insurance is amazingly low. Only 3c a day, in easy monthly payments, brings you all these protection features. No dues—no assessments.

10 DAYS FREE INSPECTION

SEND NO MONEY! Here's our sensational offer. Write, giving your age, and the name and relationship of your beneficiary. We will mail you Actual Policy on 10-days' FREE INSPECTION. No obligation whatever. Act now.

Liberal Benefits At Amazing Low Cost

AS MUCH AS

$2,500.00

paid to you IN CASH for Accidental Death or Loss of Limbs or Eyesight.

UP TO $150.00

a month for sickness including Hospital Benefits.

UP TO $100.00

a month for disability due to accident.

$100.00

Cash paid as Emergency Aid or Identification Benefit.

OTHER LIBERAL BENEFITS

Doctor's bill for non disabling injuries — 10% increase in benefits for 5 years at no extra cost.

All Benefits as described on Policy

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564 Jackson-Franklin Bldg. Chicago, Ill.

The Money Making Marvel of the Age!

PICTURE RING SELLS TO EVERYONE!

SAMPLE RING From Any Photo You Send Only 48¢

Hand Tinted in Natural Life Like Colors. 10c Extra

It's here! The hottest, most sensational, most gripping selling idea of the age! THE PICTURE RING — the ring men and women everywhere, rich and poor, young and old want to wear and keep their whole lives long. Why? Because on this beautiful ring is permanently reproduced any photograph, snapshot or picture of some loved one. Yes — reproduced clearly and sharply and made part of the ring itself so it can't rub off, come off or fade off. This sensational new idea is making an unbelievable hit. Men and women—even those without an hour's selling experience — are taking dozens of orders a day and making dollars of profit by the handful. And now, in your territory, YOU can cash in big, every day, with this exciting sure-fire profit-maker and earn money so easily, it will seem more like play than work.

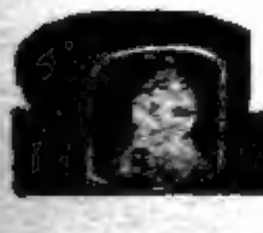
SELLS TO EVERYONE!

A Treasure Remembrance Its Value Beyond Price!

Once women carried pictures of their loved ones in lockets; and men carried them in watch cases. Those days are gone, but the desire to carry the portrait of a loved one is as strong as ever. Not until the amazing secret process for transferring pictures to rings was discovered, was it possible to revive this grand old custom and to satisfy the hunger of every human being to express again this grandest of all sentiments. How mothers and fathers will welcome this opportunity to wear a ring with the most precious setting of all — a picture of their beloved child. How happy every man and woman will be to keep alive the memory of a departed one by carrying with them always, night and day, this beautiful Picture Ring.

Order Your Sample Ring Now! You Don't Risk a Penny!

Never before has anything like this come your way. No competiton from anyone — no looking for prospects (they are all around you) — no carrying a big stock or putting any money into goods. Simply showing your sample ring a few times a day, if you only start with your friends and neighbors, will be enough to give you an endless chain of orders. We cut away all red tape and are ready to send you a SAMPLE RING at sensationally low special wholesale price of only 48c. The minute you take it out of its beautiful Gift Box you are ready to go after the orders. Rush the coupon below for YOUR sample ring NOW! That's all the outfit you need. It will do all your selling for you. And we make it easy for you to obtain this sample ABSOLUTELY FREE OF A PENNY COST under our liberal offer.



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DEPT. B-26 12TH. & JACKSON STREET CINCINNATI OHIO

Beautiful Permanent Picture Ring Made From Any Photo or Picture

For only $1.00 retail—look what you offer. A made-to-measure onyx-like ring adorned with the most precious setting in the world—a reproduction of the picture of a loved one. The ring itself can't tarnish. It will wear forever with ordinary care. The picture of the loved one is clearly, sharply reproduced with surprising faithfulness and becomes an inseparable part of the ring. It can't wear off, rub off, or fade off.

Make Pockets Full of Dollars Just Wearing Ring!

Can you imagine a more novel, more unusual gift than the Picture Ring? How can any man or woman find a more beautiful way to express loving sentiment than giving a wife, a child, a parent, a friend, a sweetheart a Picture Ring with the donor's portrait expertly reproduced! What a surprise! 10 orders a day is an easy goal—20 orders a day are not too much to expect.

SEND NO MONEY!

Hundreds of customers write they wouldn't take a fortune for their rings if they couldn't get others. $5.00 and even $10.00 would be a small price for the PICTURE RING—but as a special offer we send you the beautiful PICTURE RING, made from any photo or picture you send for only 48c! Don't wait. Rush the coupon at once for the sample ring on our NO RISK plan and see for yourself what a whirl-wind money maker this is for you. ACT RIGHT NOW!

MOTHER HUSBAND BABY

SEND YOUR RING SIZE NOW

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RING SIZE .....

Enclosed is photo. Please rush my individually made Picture Ring and starting equipment. Will pay postman 48c plus few cents postage. It is understood that if I am not entirely satisfied, I can return ring within 5 days and you will refund my money in full.
Hand Tinted in Natural Life Like Colors. 10c Extra

Name.....

Address.....

City..... State.....

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1 2 3 4 5 6 7 8 9 10 11 12 13

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NO RISK, NO CASH
SEND NO MONEY
SEND NAME
MAIL COUPON!

Everybody gets a premium or Cash Commission. BIKE or other expensive Premiums YOURS for SIMPLY GIVING AWAY FREE big colored pictures with our famous WHITE CLOVERINE SALVE for CHAPS, CUTS, BURNS, SORES, etc., which you easily sell to friends at 25c a box (with picture FREE) and remitting as explained in catalog sent with goods. SPECIAL: — Catalog shows 20 Premiums for returning only $3 collected. Constant users—please write. Millions pleased. Pictures pep sales. Salve sold most calls. BE FIRST. Mail coupon Now! Wilson Chem. Co., Inc., Dept. TG-31, Tyrone, Pa.

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Headlight Horn! Tool Box; Coaster-brake. Yes, fully equipped. Chromium plated parts. What a Bike! A brand new sporty bike for ambitious boys and girls!

Electric or Hand Operated PHONOGRAPH or CASH

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Send no money—Nothing to buy—MAIL COUPON! Size 9 x 9 x 8 complete with cord, plug, switch and speed control. Plays 10" records. Mellow tone! Have fun! POPULAR! YOURS—Easily sell WHITE CLOVERINE SALVE to friends at 25c (with free picture) and remit as explained in catalog. Be first. Mail coupon. Wilson Chem. Co., Inc., Dept. TG-31, Tyrone, Pa.

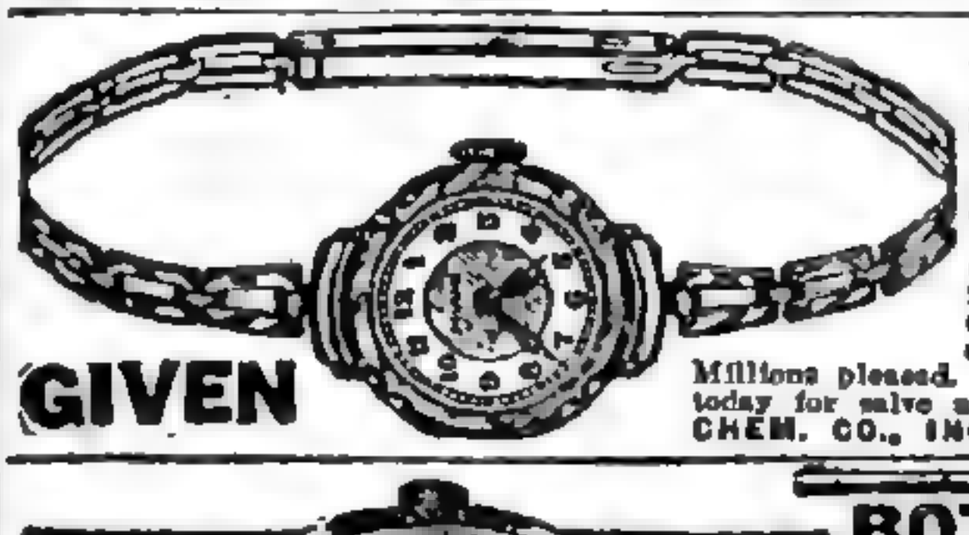
BOTH GIVEN

PREMIUMS OR CASH FOR ALL

or Cash Commission, Nothing to Buy, No Risk—No Cash—Send No Money—Send Name—Mail Coupon—Boys! Girls!

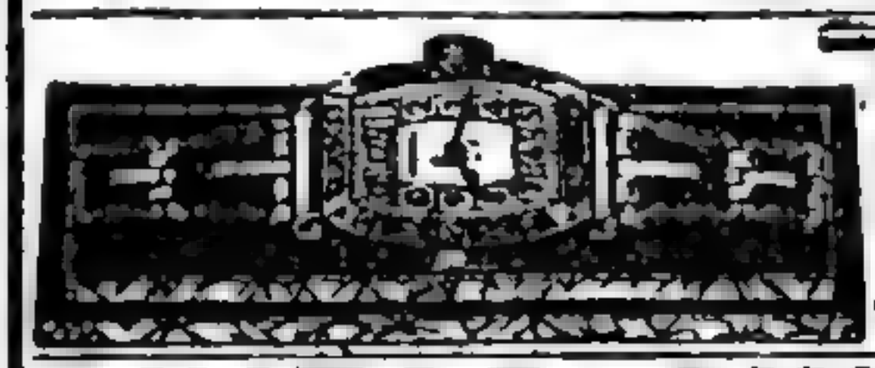
ELECTRIC PROJECTOR — 200 foot film capacity—all steel, wrinkle finish and nickel trim. 110 volt motor. AC Current-Motor rewind. Tilting device. Adjustable lamp socket. Special bulb, built in condenser. Shows good size picture. It's a whiz. LADIES! GIRLS! Charming Wrist Watch about size of dime—Dainty—Attractive—Beautiful

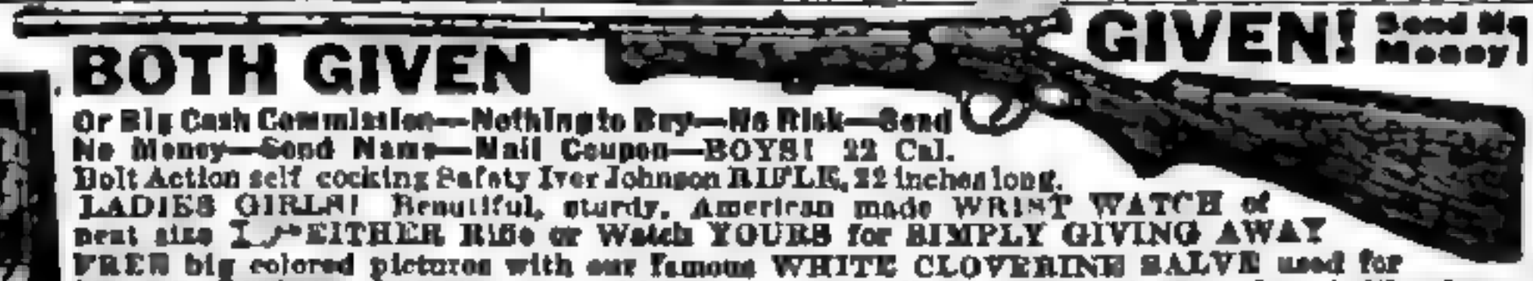
EITHER Movie or Watch YOURS for SIMPLY GIVING AWAY FREE beautiful pictures with our famous WHITE CLOVERINE SALVE used for CHAPS, BURNS, SORES, etc., which you easily sell to friends at 25c a box (with picture FREE) and remitting as explained in premium catalog. SPECIAL: Catalog of 100 premiums shows over 20 premiums for returning only $3 collected. Salve sold most every home. Millions pleased. BE FIRST. Customers waiting. Write today for salve and pictures sent postage paid. WILSON CHEM. CO., INC., Dept. TG-31, TYRONE, PA.



GIVEN

BOTH GIVEN





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Or Big Cash Commission—Nothing to Buy—No Risk—Send No Money—Send Name—Mail Coupon—BOYS! 22 Cal. Bolt Action self cocking Safety Iver Johnson RIFLE, 22 inches long. LADIES GIRLS! Beautiful, sturdy, American made WRIST WATCH of neat size EITHER Rifle or Watch YOURS for SIMPLY GIVING AWAY FREE big colored pictures with our famous WHITE CLOVERINE SALVE used for CHAPS, BURNS, SORES, etc., which you easily sell to friends at 25c a box (with picture FREE) remit as per premium catalog. Wilson Chem. Co., Inc., Dept. TG-31, Tyrone, Pa.

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Or Big Cash Commission
Send No Money
Boys! Girls!

Full Size. Nothing To Buy

Standard size regulation guitar. Regulated—fretted ebonized finger-board-pearl position dots. A MARVEL. Yours for SIMPLY GIVING AWAY FREE beautifully colored art pictures (correct size for framing) with our WHITE CLOVERINE SALVE used for burns, cuts, chaps, sores, etc., which you sell to friends and neighbors at 25c a box (giving picture Free) and remitting as explained in premium catalog.

SPECIAL—Choice of twenty premiums for returning only $3.00 collected. (44th yr.) Be first. Send today. Also many kinds of Musical Instruments and other valuable premiums Given. —We trust you. Mail coupon.

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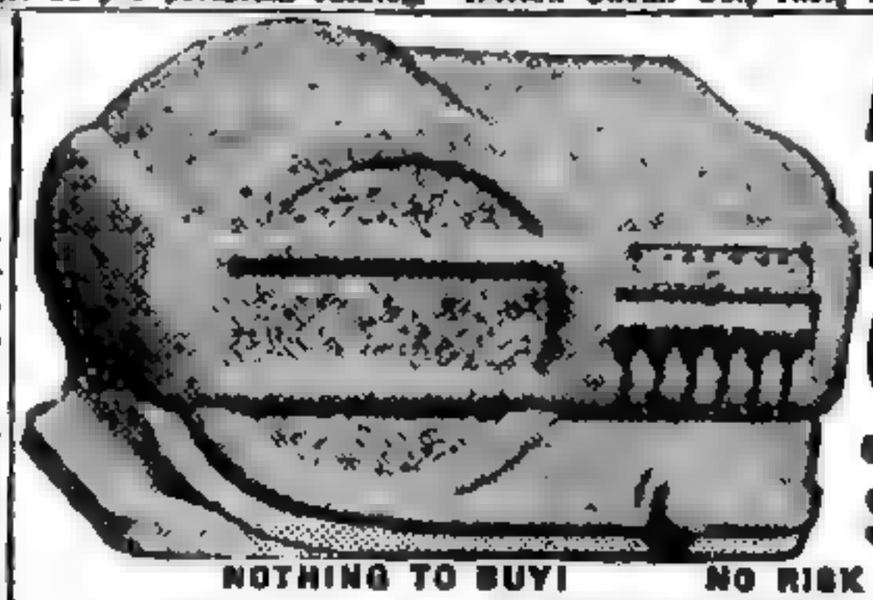

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OR BIG CASH COMMISSION

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Send Name and Address

Automatic tuning — Superheterodyne — AC-DC — No aerial or ground needed. Dynamic speaker. Tunes American broadcasts. Built-in antenna—five tubes, 6 position tuner plus regular tuning knob. Amazing! Yours for SIMPLY GIVING AWAY FREE beautifully colored art pictures with our WHITE CLOVERINE SALVE used for burns, cuts, chaps, sores, etc., which you sell to friends and neighbors at 25c a box, (giving picture FREE) and remitting as explained in premium catalog. SPECIAL—Choice of 20 premiums for returning only $3 collected. BE FIRST. SEND TODAY—WE TRUST YOU. MAIL COUPON NOW! — WILSON CHEM. CO., INC. DEPT. TG-31 TYRONE, PENNA.

MAIL COUPON NOW

WILSON CHEM. CO., INC.,

Dept. TG-31, Tyrone, Pa. Date.....

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Name.....

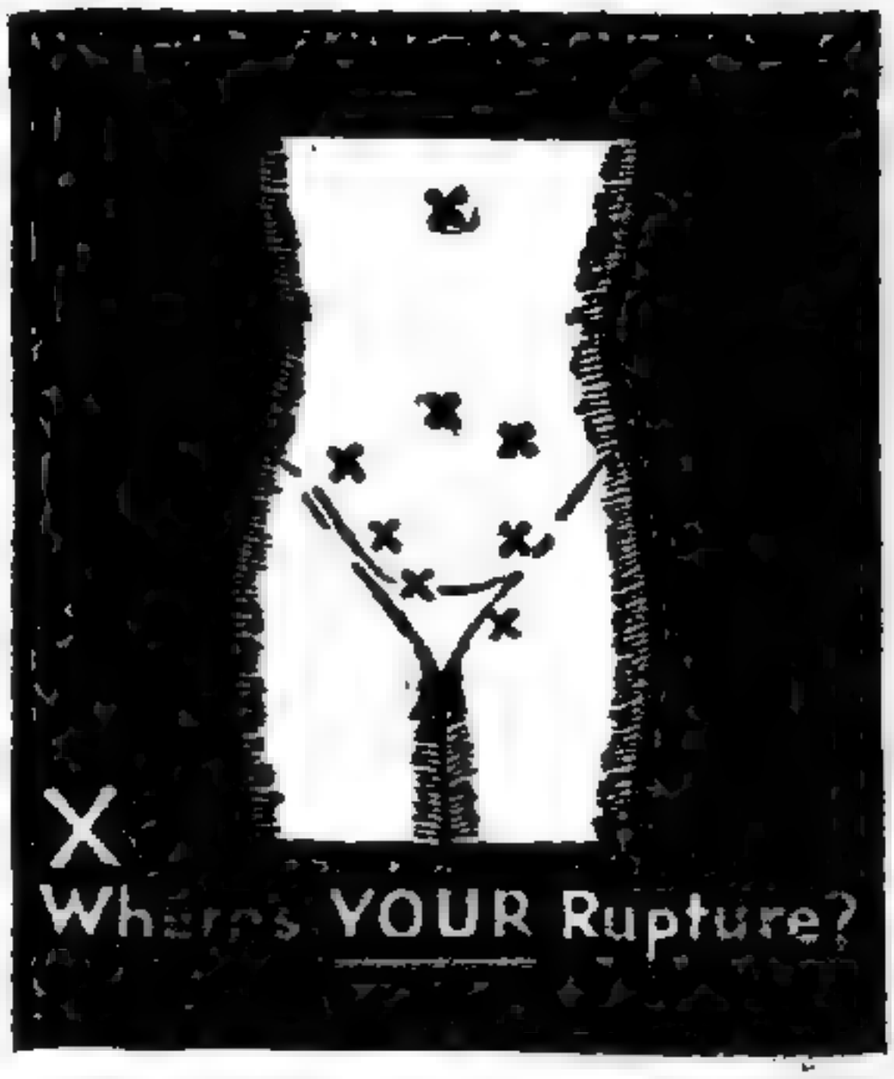
RD..... Ex..... Bx.....

Town..... State.....

Print Your Last Name Only In Spaces Below.

WRITE or PASTE COUPON on a POSTAL CARD or MAIL COUPON in an envelope TODAY!

don't Worry about Rupture



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Think of it! Here's a surprising yet simple-acting invention that permits Nature to close the opening—that holds the rupture securely but gently, day and night, at work and at play! Thousands of grateful letters express heartfelt thanks for results beyond the expectation of the writers. What is this invention—How does it work? Will it help me? Get the complete, fascinating facts on the Brooks Automatic Air Cushion Appliance—send now for *free* Rupture Book.

Cheap—Sanitary—Comfortable

Rich or poor—ANYONE can afford to buy this remarkable, LOW-PRICED rupture invention! But look out for imitations and counterfeits. The Genuine Brooks Air-Cushion Truss is never sold in stores or by agents. Your Brooks is made up, after your order is received, to fit your particular case. You buy direct at the low "maker-to-user" price. The perfected Brooks is sanitary, lightweight, inconspicuous. Has no hard pads to gouge painfully into the flesh, no stiff, punishing springs, no metal girdle to rust or corrode. It brings heavenly comfort and security—while the Automatic Air Cushion continually works, in its own, unique way, to *help Nature get results!* Learn what this patented invention can mean to you—send coupon quick!

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C. E. BROOKS, Inventor

SENT ON TRIAL!

No . . . don't order a Brooks now—FIRST get the complete revealing explanation of this world-famous rupture invention. THEN decide whether you want the comfort—the freedom from fear and worry—the security—the same amazing results thousands of men, women and children have reported. They found our invention the answer to their prayers! Why can't you? And you risk nothing as the complete appliance is SENT ON TRIAL. Surely you owe it to yourself to investigate this no-risk trial. Send for the facts now—today—hurry! All correspondence strictly confidential.

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MEET THE AUTHOR

A NEW WORLD

By JACK WILLIAMSON

Author of "The Fortress of Utopia," this Month's Book-Length Novel

IT is thirteen years since a rather lonely, dreamy farm boy stumbled across his first stray copy of a science fiction magazine—which had a glorious cover by Paul—and was instantly gripped by the breath-taking wonder of this new world of science and imagination.

At once I knew that I wanted to write science fiction, and soon forgot a planned career in chemistry to do it. The first story appeared within two years, and more than a million words have been printed since. But still I find that every science fiction story is a new and thrilling adventure.

Jack Williamson

The writing of FORTRESS OF UTOPIA—along with the science-fictional spectacles at the World's Fair and the recent Science Fiction Convention—was one of the high points of a three-month stay, this spring, in New York City.

The novel—if the editors will allow a behind-the-scenes glimpse—was evolved in a series of conferences with the staff of STARTLING STORIES.

A good deal is said, these days, about Utopias. Nearly every orator, in fact, on every soap-box, has his own utopian scheme to cure the ills of the world. And your alert editors propounded this question:

What would happen if a band of earnest scientists, equipped with a certain instrumentality, set out to transform our muddling modern world into a planned Utopia?

FORTRESS OF UTOPIA is a science-fictional answer to that question. It is a story, too, about young Jay Cartwright and dramatic Captain Drumm and grave Lyman Galt and cynical Martin Worth and lovely Pat Wayland—all of whom I learned to know and love during the months that I shared their strange adventures in the world of tomorrow.

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The FORTRESS

On a Lifeless Mystery Satellite, Five Lone Mortals Summon Secret Forces of the Citadel of Science to Free the Earth from the Doom of the Dark Nebula!

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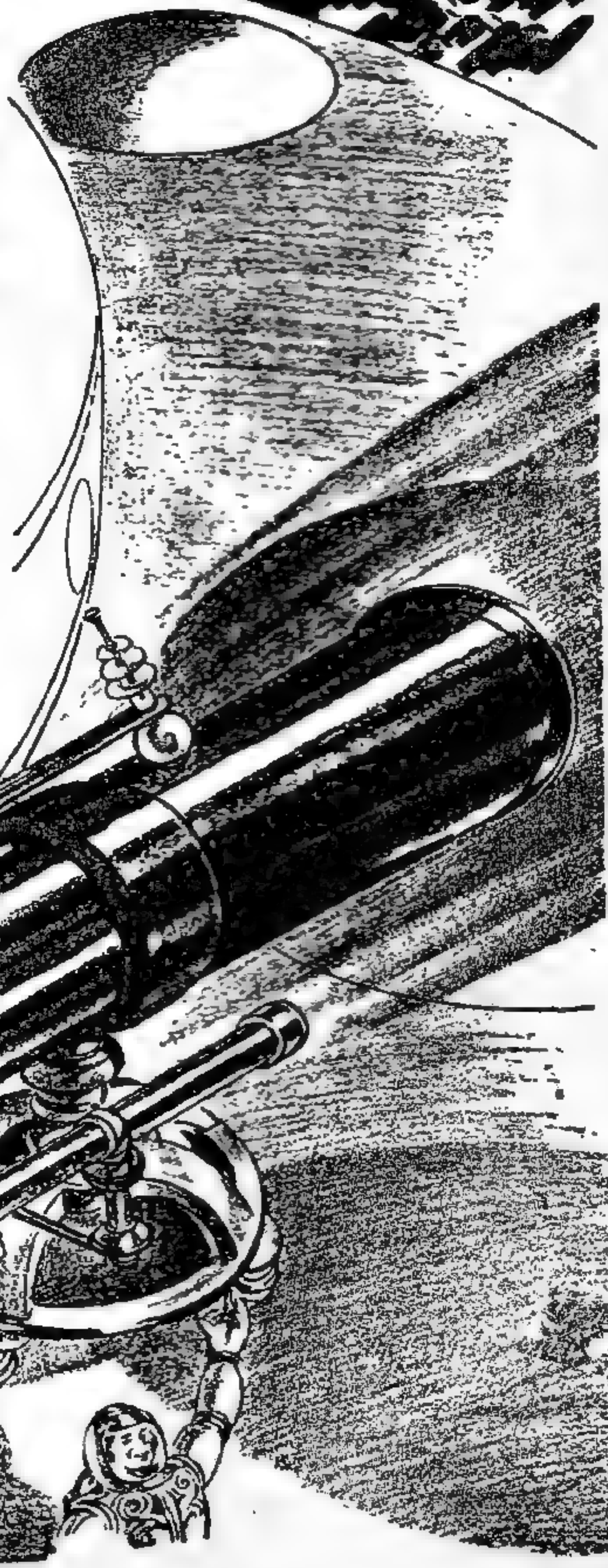
A Book-Length Novel

By JACK WILLIAMSON

Author of "The Infinite Enemy," "Passage to Saturn," etc.



That ominous shining tube was pointed at the huge brilliant half-disk of the Earth
(Chapter VII)

The FORTRESS of UTOPIA

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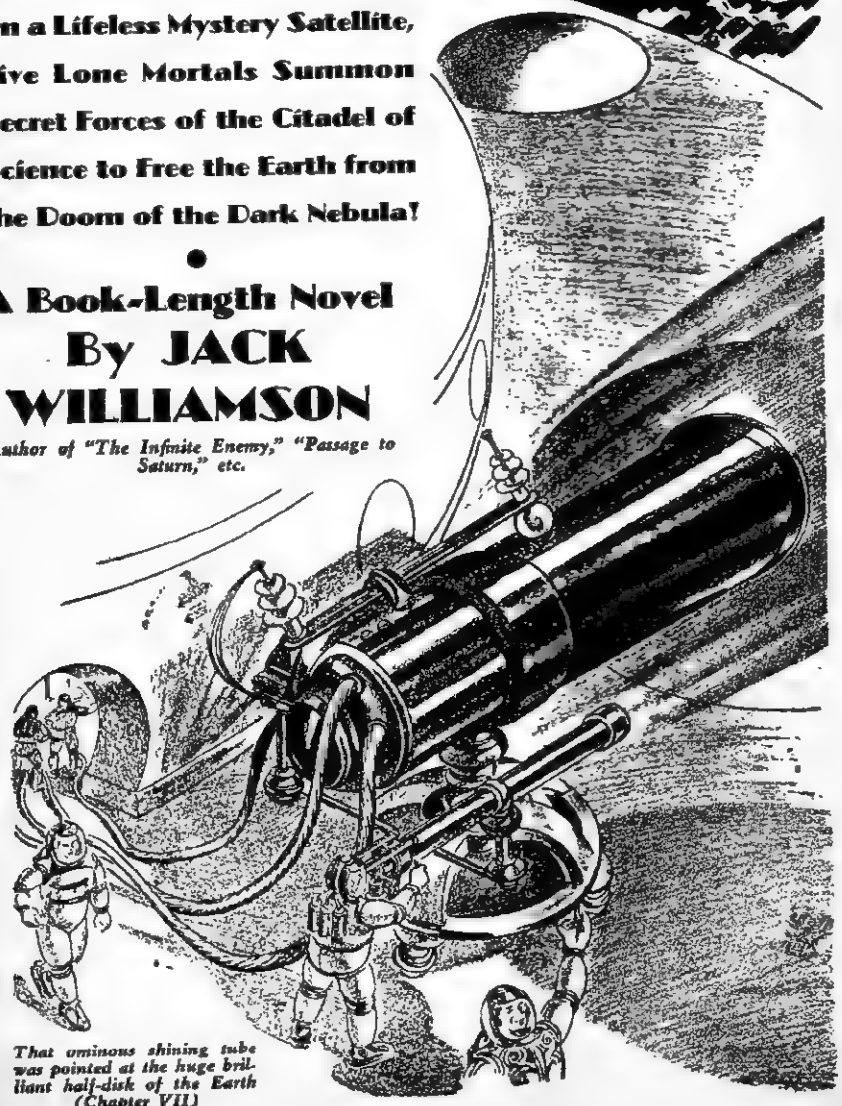

That ominous shining tube was pointed at the huge brilliant half-disk of the Earth (Chapter VII)

CHAPTER I

Rocket to Nowhere

FIRST men to the moon! Standing on the flag-draped platform at the World's Fair grounds, on that sultry summer day of 1939, Jay Cartwright was aware of his hammering heart. He forgot the white sea of intent up-turned faces beyond the ropes. The hum of speech faded from his ears. He saw only the racing hands of the watch on his wrist—racing toward the calculated second of the start.

Dwarfed in the Trylon's shadow, the slim bright spindle of the rocket stood in a roped-off space of the green parkway in the Transportation Zone. Flash bulbs flickered and news-reel cameras hummed.

Jay Cartwright was oblivious to all

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this, did not care much for ceremonial pomp. He was a slender, low-voiced young man, with mild blue eyes and yellow hair. He disliked publicity, and it was only for the sake of little Delorme, designer of the rocket, that he had agreed to this staged take-off, publicity being to the diminutive inventor as welcome as water to a duck.

How would it really feel? A thousand times, Cartwright had imagined the wild intense elation of the first man to step upon the moon, drunk with his victory over space. Would it be like that? And what would they find? Just barren lava fields? Or, as Delorme had hinted, something more amazing?

He knew the danger. His attorneys had been pointing it out for months. A man with a hundred and forty millions, they insisted, had no business to risk his life on such a suicidal project. But, Cartwright always told them, other things could be more important than danger.

He started back to awareness.

"*Oui*, we may be keeled," Delorme was saying, bowing happily at the television cameras. "But if so, we shall die gladly in ze sairvice of science."

Jay Cartwright did not so readily accept the idea of dying. When the newshawks pressed him for a statement, he forced himself to face the staring iconoscopes and the microphones, and said:

"I know we take a risk. I am willing to accept it, because I think our flight can be a useful thing. Today the world is sick with unemployment. It is jittery with the dread of war. But the science that built our rocket is international. If we win the moon, it will be a victory for all the world. Perhaps that will help the spirit of men."

The applause seemed to falter.

"Zay do not understan'," little Delorme told him. "What zay want eez heroism, courage, death." He waved a strutting farewell. "Off — to zee moon!"

He followed Cartwright up the flimsy metal ladder, into the cramped pilot compartment. They buckled their harness, tested the reaction tubes, and waited for the dignitaries to scuttle for safety below.

CARTWRIGHT watched the chronometer's creeping needle. It reached the second, and he lifted his hand. The jets made a cushion of blue fire beneath, and the whole rocket screamed with a terrific vibration.

It moved, savagely. The straps cut into Cartwright's lean body. The breath was crushed out of him. And a spinning darkness pressed upon him, as acceleration-pressure drove the blood from his brain.

Cartwright fought the darkness and fought for breath and fought that ruthless pressure. Elation bubbled in him, for they were safely off!

Frantically he labored to keep up with his thousand practised tasks, setting and reading instruments, watching a hundred dials, making swift calculations. The bellow of the jets annihilated all other sound, and he passed the figures to Delorme scrawled on bits of paper.

A needle quivered, and he felt the whole rocket shudder. He scrawled a question mark. Delorme's face was white. He held up three fingers, and pointed anxiously down toward the rocket compartments. Then his hand came with a clutching movement toward his throat, and his small body slumped limp in the harness.

Cartwright seized the dual controls. It was a two-man job, to watch the banks of instruments, make all the computations, and balance the thundering jets to hold the rocket on its course. But he tried to carry on alone.

That needle flickered again, back to zero. And the rocket flung sidewise as if some gigantic hand had struck it. Three equalized tubes drove the rocket; their hundred-ton thrusts had to be kept in perfect balance.

With the steering jets, in the nose, he brought the rocket back upon the course, and battled to keep it there. And the minutes, under the terrific tension of a six-gravity acceleration, stretched into hours.

Every muscle and tendon in his battered body ached. A thin unnoticed

stain of blood was hardening on his upper lip. His head throbbed to the roaring of the jets, until almost he envied Delorme's oblivion.

Watching the schedule pasted to the steel wall, he gratefully cut the acceleration as the radio-altimeter pointed off the hundreds of miles. To five gravities, four, and three, and two.

When Number Three Tube cut out again, it was easier to hold the course with the steering jets—but, with each successive failure, the tube was cut out longer. At this rate, the steering tubes would be burned out long before they reached the Moon.

They were eight hundred miles from Earth when he cut the acceleration to one gravity. He stretched himself thankfully in the harness. And little Delorme lifted his head, mopping at a stain of blood where his brow had struck a key.

"Mon Dieu!" His thin voice was audible above the lessened shrieking of the jets. "Speak of going over your Niagara Falls in a barrel—that is a couch of eiderdown!"

The rocket lurched aside again.

"Parbleu! It is Number Three—probably a leaking valve on zee potassium vapor element. I theenk I can feex it."

He unbuckled his harness. Swaying weakly, he let himself through the bulkhead valve and climbed down the ladder toward the rocket compartment. The automatic valve closed behind him. Five minutes later the little telegraph disk clattered to "Emergency" and then to "Power Off."

Cartwright snatched for the firing levers.

THEN it was that the Moon-Expedition, begun with such confidence and pomp, came to its sudden, premature, and obscure end!

There was a stunning concussion. The bulkhead warped upward. Deafened, Cartwright saw the flare of incandescent vapor outside the ports. Bruised, half-stunned, he wound up the little hand-powered emergency transmitter, to send the rocket's last

JAY CARTWRIGHT

signal back to Earth:

"Explosion! Main tubes wrecked and Delorme killed. Falling. Will try to use steering jets—"

In what seemed like only a timetick, the Earth's shadow, from which they had escaped, once again embraced them. They dropped into Earth's atmosphere and into night. Desperately Cartwright tried to turn the dizzy fall into a glide—

Crack-up!

Cartwright lived, his left arm broken, not knowing where he was, and unable to communicate with the outside world because the little emergency transmitter was hopelessly smashed. It took him two days to build an oxygen torch, and with it he cut his way out of the wreckage.

He looked about him and his heart sank. The rocket had fallen in a tropical rain-forest. The ants were already at work on Delorme's body. He buried it and sought water.

The rain-forest was a nightmarish dream in his subsequent wanderings. Mighty branchless boles towered into it like the pillars of some dark cathedral. Gigantic lianas, writhing like snakes in the gloom, tripped and impeded him. Reeking swamps sucked

him down into quaking black ooze. Mosquitoes were humming clouds of torture.

He grew ill. Fever parched his skin, dried his mouth, fogged his brain. He lost the supplies he had brought from the wreck. He was staggering in delirium when he came through the terrible marshes, to the bend of a mighty river.

There he built a raft. A tottering yellow skeleton, fever-maddened, starved, one arm slung, he flogged himself day after day to the task. The day the raft was done, the river fell six inches. The raft was immovable.

Exhausted with the effort to pry it free, he flung himself down upon his useless pile of wood. He was too far spent to curse or to sob. Back in the jungle, he heard a soft and now familiar susuration. He saw a rodent scamper past. He knew that it was fleeing from the army ants. But he was too far gone to care.

Then, with all hope gone, had come the rescue. It had a fantastic dream-like quality. It was like a part of his delirium. The machine that settled, with a soft deep thrumming sound, beside his raft upon the sand bar, was like nothing he had ever seen.

It was wingless. There were no propellors or projecting cathion tubes. It resembled a huge silver egg. There were two shining greenish disks at the ends. Painted on the side of it was the outline of an antique clay lamp, lettered, *Utopia, Inc.* Larger characters, beneath, spelled: *Pioneer.*

NURSING his throbbing arm, Cartwright managed to sit up on the raft. He shook his unkempt, fever-buzzing head. He could not credit his senses, believing that his sick brain was fashioning visions as a mental barrier against the whispering horror of the ants.

But an oval door was opening in the side of that white metal egg. Metal steps rattled down, and a tall man descended them. Cartwright's hollow, fever-glazed eyes blinked. The vision was real!

The stranger was bronzed and erect. He glittered magnificently in an unfamiliar uniform of crimson silk, stiff with gold braid. A string of polished medals shimmered across his chest. He came with a brisk military stride to the raft.

"Cartwright, I presume?" He had a deep, crisp voice. "I am Captain Drumm. Captain Norman Drumm, once of the army engineering corps. Please accept my condolences for the failure of your lunar flight. And may I offer you transportation back to New York, with the compliments of Utopia, Incorporated?"

"Thanks," Cartwright gasped. "Utopia—what—"

He didn't hear the answer, because, at that instant, a wave of dizziness overcame him and he toppled off the raft. Dimly, he felt this strangely uniformed captain lift him, carry him without effort. A booming rhythm, as the queer ship lifted. And then nothing at all.

Nothing — until those first disordered snatches of awareness, when he lay on a narrow bed, too weak to turn himself, staring at the green-and-ivory ceiling of his room in New York's Tropical Hospital.

The illness had been graver than he had suspected. He remembered the weak misery of his fever-parched body, the endless throb of his bursting head, the blurred endless procession of nurses, doctors, examinations, treatments—

And then the joyous wonder of returning health.

"Young man, don't thank me," little Dr. Corken told him. "You owe your life to three people connected with this mysterious Utopia Corporation."

"Utopia—" Cartwright groped into dim memory. "What is it?"

"Some sort of scientific club, apparently," the little doctor told him. "It was their astronomer, Martin Worth, who figured out by mathematics that your rocket would fall near the Negro River in Brazil—after the Fleet had been ordered to search the North Atlantic. It was their Captain Drumm, who found you with his plane—"

"If that was an airplane, I must have been out of my mind!" Cartwright said.

"You were," Corken assured him. "Somewhere in the swamps, you picked up a brand-new type of encephalitis. We had given you up, here at the hospital, when Dr. Wayland sent for a specimen of the virus and made a successful serum. Pat Wayland is also connected with the Utopia Corporation."

"If you can get in touch with any of them," Cartwright said, "I want to thank them—materially. Utopia, Incorporated sounds like a humanitarian enterprise. And a hundred and forty millions is quite a responsibility, doctor. Especially since I only inherited it. I want to invest it where it will do the most good to mankind."

PRESENTLY the letter came to him at the hospital. Above a Manhattan address was that odd symbol of the burning lamp. The puzzling message ran:

Dr. Corken has communicated with us. We thank you for your offer of aid. And we need it desperately. For our world lives today in the shadow of unsuspected danger.

If you are grateful for your life, please come to us. Let us show you the scientific evidences of this approaching disaster. Let us beg your aid for our plan. For that is the world's only chance to survive the Holocaust.

Lyman Galt, Director
Utopia, Incorporated.

The next day he was discharged as cured.

Now, as the elevator flung him upward toward the top of the city's tallest building, that singular letter was crushed in Cartwright's perspiring hand. What was the Utopia Corporation? The approaching "Holocaust?" The Plan that might save mankind? He was on his way to find out.

CHAPTER II

The Dead Pocket

CARTWRIGHT opened a door that bore the now familiar emblem of the flaming antique lamp. Somehow, the mystery surrounding

CAPTAIN DRUMM

Utopia, Incorporated, had made him expect modernistic glass-and-chromium luxury. But the reception room in which he found himself was simple and plain.

A girl was busy at the desk, removing fragile pieces of laboratory glassware from a carton, and checking them off a list. She was absorbed in her task and did not look up.

Cartwright's eyes passed her, then came back. He stared — with good reason. The girl was exquisite. A light tan warmed her flawless skin. Her hair was shining platinum. Her face had a smooth, doll-like perfection.

Jay Cartwright had been so diligently pursued by certain female seekers of that hundred and forty millions, that he had come to avoid feminine society. But there had been none like the girl before him. He wondered how she came to be working in an office.

He had forgotten to speak. When at last she did look up at him, he saw that her eyes were a soft clear blue. Altogether, she almost took his breath. In a sugar-sweet, quiet voice, she remarked innocently:

"After all, this isn't the waxworks."

Cartwright turned red and gulped. He fumbled awkwardly for Galt's letter, and told her his name.

"Oh!" The girl stared at him with widened blue eyes. He had an odd impression that her baby-face was deliberately vacant. "Lyman's is the second door."

The platinum splendor of her head bent again. Cartwright was puzzled by a momentary sparkle of interest he had seen in her eyes.

"You would almost think," he told himself, "that she was conscious!"

BEYOND the second door, he found himself in a larger office. The windows overlooked the ragged canyons of Manhattan. This room, too, looked simple, utilitarian, worn. Sitting behind a cluttered desk was a big, tired-looking man.

"You're Cartwright!" He rose, smiling. "I came to see you at the Tropical. I'm Lyman Galt."

He looked forty. Dark hair was retreating from his temples. His unpressed suit was yielding to the muscular mass of his body, his collar was open to show a powerful neck. His wide brown face was criss-crossed with wrinkles of fatigue, and his dark tired eyes looked very solemn.

"I got your letter." Cartwright smoothed the crumpled envelope in his fingers. "It had a mighty serious sound." He searched that broad worried face. "About this—Holocaust?"

"Very serious indeed."

Something in the deep timbre of Galt's voice sent a queer little shudder through Cartwright. He caught his breath, and sat waiting.

"I should tell you," rang that solemn voice, "that we exerted our efforts to save your life in order that we might be justified in calling on you for aid. Yet we can't ask you to join us out of gratitude alone—the thing is too big for that."

"Well?" Cartwright moved impatiently in his chair. "Just what is this menace? And what is it that your mysterious Utopia Corporation plans to do about it?"

Galt sat impassively behind the big desk.

"First," he said, "I must tell you something about my associates — the three who jointly saved your life. But you have already met Pat Wayland, who made the serum—"

Cartwright shook his head.

"No. But I'm anxious to thank him."

Galt smiled solemnly, and his dark unkempt head moved a little toward the reception room.

"Pat," he said, "is for Patricia."

"Eh!" Cartwright gulped. "I thought—"

"Others have been deceived," Galt told him gravely. "That is an eccentricity of Pat's. She isn't easy to understand."

He stared for a moment, silently, at the door. "She is a beautiful woman and a splendid scientist," he said slowly. "It is better to forget that she is a woman. Just remember that she is a biologist who ranks with Mendel and Darwin, a psychologist who is the peer of Watson and Pavlov."

With a faint and somewhat bitter smile, Galt shrugged.

"Pat's brilliant discoveries," he said, "form the very heart of our Plan."

"And," Cartwright prompted him impatiently, "—the Plan?"

It seemed to Cartwright that a film of odd reticence obscured the frankness of Galt's dark eyes. They looked away, evasively. Galt's big fingers drummed nervously on the desk. He started to speak, checked himself.

"Well?" Cartwright said. "You asked me here, to tell me about some approaching danger to the world, and a plan to avoid it. I'm listening."

Galt nodded.

"First, before we go into any details of the Plan, I want you to see for yourself the scientific evidence of the approaching Holocaust. It is a thing so tremendous that I could not ask you to accept it on my word alone. Dr. Worth and Captain Drumm will be here at dusk, to take you to our observatory. You met Drumm, of course, in the jungle. Worth is our astronomer. It was he who discovered the menace of the Holocaust."

"Drumm?" Cartwright made a bewildered gesture. "The memory is

sort of mixed up with my delirium," he said. "I remember him—a big man in a queer uniform. I erroneously thought he came in a machine shaped like an egg."

"He did," said Galt. "That was our geoflexor, the *Pioneer*."

Cartwright's blue eyes blinked.

"Worth discovered the principle of geodesic inflection twelve years ago," Galt told him. "It offers a means of direct reaction against the structure of space itself. Drumm helped design the *Pioneer*. It is an ellipsoid, pro-

MARTIN WORTH

pelled by the space-warp created by the two terminal geodes—"

Cartwright got slowly and unsteadily to his feet. Supporting himself with his hands, he leaned over the desk. He had a peculiar, uncomfortable feeling of tiny cold feet chasing up and down his spine.

"We were trying to fly a rocket to the Moon," he whispered, "when you had—*that?*"

"That's it," Galt said. "We first reached the Moon eleven years ago. Worth's observatory was finished the same year—it's on the central peak of Arzachel, between Ptolemy and Tycho. Drumm himself has also been to Mars and Venus, but the desperate urgency of the situation has left no time for any idle explorations."

CARTWRIGHT gazed, unbelievingly, at the small simple office, with its neat rows of filing cabinets along the wall. He saw a long panel of framed photographs, and blinked at them.

"My few visitors," Galt said, "usually take them to be imaginative drawings."

Cartwright rubbed at his forehead.

"Eleven years—that long?" he whispered. "Captain Drumm has been out exploring space—while the world was wallowing through the Depression!"

He gave a short, mirthless little laugh.

"So, even if we had made it, we wouldn't have been the first. Poor little Delorme—he died for nothing!"

"Why say that?" Galt asked solemnly. "Utopia, Incorporated, will keep its secrets intact. The world will never know what we have done."

"But what is the reason for your secrecy?" Cartwright demanded in bewilderment.

"You will understand," Galt promised, "when you learn the Plan. Meantime, I'll summarize the reason as a deep mistrust of contemporary civilization—so-called."

His voice went on hollowly:

"Could we give the geoflexor to the world — knowing that its chief use would be to rain bombs on cities?" He shrugged, and rose. "You've a couple of hours, before dusk. Would you care to look at Drumm's Martian notes and photographs?"

When two men entered the office at this point, Cartwright recognized the big adventurer at once. Tall, broad-shouldered, Drumm was magnificent in the crimson-and-gold of his fantastic uniform. He had crisp reddish hair. Earnest blue eyes shone from the tanned stern simplicity of his face.

"Cartwright!" His voice was a hearty boom. "So you're to see the Moon, after all?"

He introduced Martin Worth. The astronomer was a small thin man. His

skin was very white. His retreating hair, heavy sloping brows, and small pointed beard, made a series of black V's upon it. His dark eyes had a cynical twinkle, and his nearly fleshless face bore an expression of perpetual sardonic amusement.

Moving with the effortless gliding grace of a professional dancer, Worth came to Cartwright and shook his hand. All his motions were silent, quick, deft.

"Cartwright, I recall you as part of a very interesting mathematical problem." His voice had a hushed, almost whispering quality. "I understand that Galt has chosen you to share our distressing discovery—if you will come with us to the Moon."

On a walled terrace outside, beneath a striped awning, they found the *Pioneer*. Cartwright thought it looked oddly tiny, to be a ship of space.

AN egg of silvered metal, twelve feet in diameter and eighteen long. Criss-crossed with riveted seams, pierced with small round ports. Tipped, at each end, with a massive disk of red copper alloy.

Folding steps led them through the heavy oval door, up through a tiny lock-chamber. They emerged upon a flat deck which divided the interior, a little below the center. Long seats and compact cabinets were built against the curve of the dome.

An intricate-looking control board curved across one end, with larger observation panels of thick fused quartz set in the steel hull above it. Striding toward it, Drumm paused to touch the curving metal overhead.

"Two inches of a special nickel-chrome steel," he said. "Laminated, welded, and riveted—forty tons of it. There are automatic shutters of the same for all the ports."

Little Martin Worth smiled his sardonic smile.

"And still," he said softly, "a forty-gram meteor would smash quite a hole in it."

Drumm's laugh rang loud under the dome.

"Your viewing with alarm won't scare Cartwright," he said. "He has been to space in something worse than this." He spun a bright wheel, and the heavy door clanged behind them. "The valve is sealed," he said, "with five hundred pounds of pressure in a flexible hydraulic duct."

A motor beneath the deck hummed in a rising crescendo. Then abruptly the deck quivered to a mighty, muffled drumming reverberation. Cartwright felt an odd little lurch, and wondered why the ship didn't rise. He stepped toward one of the ports.

"I thought—"

His voice became a sob of dismay. He grasped frantically at the sliding emergency shutter. For he could see the bright-lit familiar panorama beneath him—and it was tilting crazily!

A giddy faintness seized him, as the surface of the planet seemed to spin from beneath. The Earth was *beside* them. Beneath there was only a bottomless and terrible abyss of stars.

"Better look back inside," Worth's suave voice advised.

Cartwright did so, and his vertiginous terror vanished.

"I felt just as if the Earth was sliding out from under us," he whispered.

"A natural illusion," the little astronomer told him. "The entire ship is included in the propulsive field of the main terminal geodes—those copper disks at the ends of the hull. Since each atom of the ship and our bodies is accelerated equally by the geoflexion reaction, there is no sense of motion.

"But, for our comfort and convenience aboard, we have a secondary set of geodes installed below the deck. Our bodies are included in their field, while the hull is not. The result is a sense of force, which we adjust to an approximation of Earth-gravity."

Cartwright sank upon one of the long seats.

"And I thought our cathion rocket was something modern!"

"The *Pioneer* isn't any rocking chair." Worth's thin face was twisted with his sardonic grin. "A meteor the size of your hat could smash us into a ring around the Moon. And just wait till you've been in a dead pocket!"

SMILING, Captain Drumm swung back from the controls.

"Don't let him get your goat, Cartwright," he boomed. "Mart sees the dark side—he was made that way. But we've been in dead pockets before, and got out again."

Cartwright looked uneasily at Worth's satanic face.

"What is a dead pocket?"

"There are areas," said the little astronomer, "usually in the vicinity of strong gravitational fields, where the geoflexor drive doesn't work. The field simply doesn't mesh. And there is a resistance in the coils that heats them dangerously. If we happen to hit anything while the geodes are dead, or if a coil burns out—"

He shrugged, and all the V's grew sharper and more sinister on his face.

"Don't listen," called the hearty voice of Captain Drumm. "Mart's just a black pessimist. He can't cross the street without expecting a taxi to get him."

But Cartwright remained uneasy.

The rush of air grew to a scream about them, and faded. Cartwright went back to the port, and conquered that vertigo. He found the lights of the metropolis, a contracting star on the field of darkness behind.

"We're already out of the atmosphere," he said, and it was more like a question. "What's the power?"

The little astronomer lifted a hatch cover set flush in the deck. That drumming reverberation welled louder from below.

"The power tubes." Kneeling to point, Worth raised his voice. In the dark cramped space beneath the deck, a row of tall transparent cylinders shone dimly. "The silver cathode is at the focal point of an intense geodic field. The atomic fields are warped, and there is a swift emission of electrons. They are collected by the grid-element above. The potential is four hundred volts, the out-put of each tube about two thousand kilowatts."

Cartwright swayed again to his feet.

"Atomic power!" he gasped. "And you had this back in 1927!"

Then he groped at one of the long brass hand rails, for the ship had lurched sickeningly. It seemed to drop, hang, and drop again. He looked faintly at Martin Worth.

"A dead pocket?"

The little astronomer grinned sardonically.

"Not yet—we're just feeling the edge of one."

Cartwright clung to the seat. He watched the broad red back of Captain Drumm. The big space pilot had risen off his seat. He was leaning over the controls. Gold braid flashed as his hands moved with a lightning skill.

"Chin up, Cartwright," he boomed. "We'll come through!"

Cartwright looked uncertainly at the thin, somewhat diabolical smile of Martin Worth. He was glad that he was a good sailor. Then he began to have a disquieting doubt that he was so good, after all.

Then the ship dropped—and didn't stop dropping.

A gong clattered on the instrument panel, and there was a sudden reek of burned insulation. Drumm was desperately busy at the controls. There was a deafening, head-splintering crash. And Cartwright's world turned black.

CHAPTER III

The Holocaust to Come

JAY CARTWRIGHT was definitely surprised later to find himself lying unhatmed on one of the long, bunk-like seats. The machinery of the *Pioneer* was drumming evenly again. He saw Martin Worth's sardonic grin.

"Never mind, Cartwright!"

Blue eyes smiling out of his deep-bronzed face, Captain Drumm looked back from the controls.

"A meteor the size of a good particle of dust always sounds like the end of the world," he said. "And that feeling of weightlessness when the gravity-coils are dead is a thing the body has got to get adjusted to. Just take it easy and we'll soon be on the Moon!"

Cartwright stared in fascination at the bright mystery of the Moon's approaching face, which he and Delorme had striven so vainly to reach. He found the vast cragged ring of Arzachel—it was hard to think that any human work would be waiting for them there.

Captain Drumm set the *Pioneer* down gently upon the central peak. The throb of the geodes was suddenly still.

"Hold on," warned Drumm. "I'm cutting the gravity field."

Cartwright understood that caution when the reaction of unaccustomed muscles flung him painfully up against the metal dome. He rubbed his head. Something about weighing twenty-five pounds made him feel queerly giddy. His stomach was uneasy.

Through a port, he glimpsed the stark moonscape. It was all highlights and blackness. He forgot all his discomfort in a voiceless awe at its stern splendor.

Worth had flung open the inner door of the little air-lock. Off their hooks he was dragging bulky suits of stiff, white-painted fabric. He thrust one of them at Cartwright.

"My size ought to fit you," he said. "It goes on like oldtime underwear."

Captain Drumm helped him into it. There was a double zipper, up the front, and the seam was sealed with air pressure in a flexible tube.

"The breathing mixture — oxygen and helium—is in this shoulder tank," Drumm informed him. "Adjust the valve until you can breathe comfortably. The main tank is good for three hours. The emergency, two more."

The tiny air-lock let them out, one at a time. Cartwright lost his balance as he stepped down upon the Moon, soared up again in an involuntary leap. Drumm caught him. For a moment he was breathless, gasping.

"You've forgotten your valve."

Drumm turned it, for Cartwright was lost in wonder.

The silver of it blinding in the westering Sun, the *Pioneer* lay upon a rugged, irregular summit, many acres in extent. A full mile below—so far that its convexity was instantly visible—lay the crater floor.

A cruel and lifeless desert, burning gray-white under the Sun. Riven with ragged cracks, pitted with thousands of circular craterlets.

Thirty miles and more away, the walls of Arzachel thrust up. The jagged peaks beneath the Sun were etched in a fantastic dead-black silhouette, and they flung an ink-black ragged shadow far across the plain of hell.

The eastward rim raised pinnacles of fire against the appalling blackness of the star-hazed sky. All colors were sombre, dull-red, brown, smoky yellow.

CARTWRIGHT flung back his head, in the stiff helmet, and found the Earth. It was northward from the zenith, a huge broad crescent, mistily blue-green.

"Come." Worth had touched his inflated sleeve, and the sound vibrations were transmitted faintly. "The observatory."

Waddling in the huge, white-painted suit, he made a fantastic figure. Cartwright followed him. They rounded the silver egg of the ship, and climbed a narrow trail. Seeking to adjust his muscles to one-sixth their usual burden, Cartwright lurched, stumbled. Suddenly he lost his balance, toppled off the trail.

Spinning downward, into a chasm of awesome night, he screamed—and knew there was no air to carry his cry. He plunged down for an endless time, picturing the sharp fangs of rock that waited down on the crater floor.

Then a lasso settled around him.

"I ran away to the west when I was thirteen." Captain Drumm buckled the coiled lariat back to his belt. "And, remember, you fall only about two feet the first second, here."

"Thanks," gasped Cartwright.

At the top of the trail, on the highest ragged peak, a silvered dome flung off blinding lances of the sun. Worth [illegible]side a flimsy-seeming section of bright metal, to reveal a powerful telescope.

"Only a twenty-four-inch mirror," Worth said. "But the perfect seeing

"Ready," said Pat. "Five seconds of mathematics" (Chapter V)

here makes it more effective than the largest instrument on Earth. And we have a new fine-grain emulsion with sixty times the speed of anything used on Earth, which alone makes it the equivalent of the new two-hundred inch reflector they are building in California."

His whispering voice was suddenly grave.

"But this is what we came to show you."

The great tube swung toward the northward horizon, the floor-platform lifted them. Worth made Cartwright seat himself at the eyepiece. At first he saw only a circle of utter black, scattered with a few tiny hard atoms of light.

Worth touched his arm, and sound came:

"Notice the visibility—any astronomer would give half his life for one night here! This is in Perseus, three degrees from the double cluster. Look at the stars at the top of the field. Notice anything?

"Fainter, maybe."

Worth's whisper was solemn.

"Don't you see that their light is diffused?"

"They're misty," Cartwright agreed. "They seem to have little halos."

"Exactly," said the astronomer. "Because they are shining through the edges of a cloud. And there are other stars that have been blotted out com-

pletely, because they are behind the cloud."

"What sort of cloud?"

"To the eye, even with telescope, it is no more than a shadow on the stars. But here is a plate we took with the fast emulsion, and a twenty-hour exposure."

Worth snapped a switch. In a large square cabinet, a light went on. Transmitted rays illuminated a large photographic plate. The same pattern of stars burned out, brilliantly. And across them was a black and ominous cloud.

The astronomer's arm went tense.

"There it is—a dark nebula."

THE center of it was a black globular mass. That was flattened into a disk. And long vague spiral arms were flying from the edges of the disk.

Staring, Cartwright repressed a faint shudder. There was something appalling about that cloud of darkness. The spiral arms of it looked somehow like the groping tentacles of some unpleasant monster.

"I give up." Fighting that shuddery feeling, he tried to grin. "What is it?"

Worth's dark eyes, beyond the round face-plate in his helmet, looked so grave that Cartwright hastily erased the grin.

"A stellar nebula," said the little astronomer. "A cloud of gas and dust and meteoric debris, loosely held in its own gravitational field.

"It is the sort of condensation, according to cosmogony, that should have formed a star. Perhaps its mass was a little too small, or its angular moment a little too great. Perhaps, billions of years from now, it will yet give birth to a star."

The bulky white suit made a little shrugging gesture.

"That doesn't matter."

"Well?" demanded Cartwright. "What is it that does?"

"The fact that the nebula is approaching the Earth," said Worth's suave whisper. "My analysis of its spectral shift shows a relative radial velocity of nearly seventy miles a second. And it has no perceptible proper motion. That means that it is moving to intersect the path of the Sun and the planets, in Lyra. Collision is inevitable."

"Collision!" Cartwright shook his head, peered. "And what will happen?"

"To the solar system, very little," said the astronomer. "The nebula is quite diffuse. Its matter is scattered through a disk sixty billion miles across. Its mean density is what we should call a fairly hard vacuum. The Sun will surely pass through unharmed. I think none of the planets will be lost—although the orbits of the asteroids and some of the smaller moons are apt to be affected by meteoric collisions. *But*, for men, the outlook is less cheerful."

In the chill darkness beneath that metal dome upon the Moon, Cartwright shuddered as if the deadly shadow of that stellar cloud had already fallen upon him. He clutched at Worth's stiff-clad arm.

"What"— His voice was a croak— "what will happen to mankind?"

Worth's big helmet nodded at the telescope.

"THE picture is quite clear," came his whispering voice. "The first thing streamers of dust will absorb the sunlight, first the ultra-violet, finally even the red. The Sun will turn crimson, and then fade out.

"That unnatural night will be a warning of the end. For several months, perhaps, the planet will be gripped in its bitter cold. Atmospheric moisture will fall as snow. Probably even the seas will freeze over.

"But then, as the Earth drives into the denser clouds, there will be heat again—and light. That last day will be more terrible than the night. For its light will come from rains of meteors.

"And that will be the end—a hail of fire. The meteors, falling ever faster, will burn the oxygen out of the atmosphere. They will beat down on an asphyxiated world. Their heat will vaporize the seas. Finally it will probably fuse even the smoking des-

erts that will then cover all the planet."

Worth stared out of the dome for a moment, toward that invisible speck in the silver-dusted splendor of Perseus.

"After a few years," he said at last, "the Sun will emerge unchanged beyond the cloud. The planets will still attend it. But no spark of life will survive to repopulate them—*unless our Plan succeeds.*"

"What can men do?" Cartwright shuddered. "What can they do, against—that?"

"We have a Plan," Worth assured

LYMAN GALT

him. "Galt organized the Utopia Corporation to carry it through. We have been working on it ten years. With your help, we have a chance—just a good chance."

"One thing," Cartwright said abrutly. "How long have we?"

The astronomer seemed to hesitate. Peering into the darkness of his helmet, Cartwright was unable to see his face. His suave voice, when at last it came faintly through the contact of the suits, seemed curiously evasive:

"My computations are not yet complete. And the boundaries of the nebula, as you can see for yourself, are rather indefinite."

"But you have an idea," Cartwright insisted. "Is it two years? Five? Ten?"

"I can promise that there will be time to carry out the Plan," said Worth. "But very little to spare."

"Then how long will your Plan take?"

"Galt will tell you," the astronomer said, "when you get back to Earth."

CHAPTER IV

The Fortress on the Moon

LITTLE MARTIN WORTH announced that he was going to remain on the Moon, to continue his observations of the approaching nebula. He showed Cartwright a twelve-foot ball of white-painted metal, half buried in the rock below the observatory.

"An air-chamber," he said. "I've a bunk in there. Food and water. Cylinders of oxygen and helium. My books and instruments. I have lived here half the time, for the last ten years."

Cartwright and Captain Drumm shook his thick-gloved hand, and climbed back down the trail to the argent egg of the *Pioneer*. The valve clanged behind them, and the little ship lurched and boomed away on the Earthward flight.

Splendid in his gold-and-crimson, Drumm grinned back from the control board. His stern bronzed face was firmly set, but his steely blue eyes shone joyously.

"Some job ahead of us, eh?" he shouted. "As big a job as four fighting men and a girl ever tackled! You're lucky to be one of us, Jay. We—"

The mighty thrum of the geodes faltered, and the little ship dropped. Cartwright's stomach felt very uncomfortable again, and he snatched with trembling fingers for the brass handrails.

Captain Drumm spun a bright

wheel, tapped colored keys, carefully inched two small levers forward. That sickening fall ceased as abruptly as it had begun. The powerful throb of the geodes rolled evenly again.

"Some sport, eh?" The tall pilot looked around, grinning. "You never know when you're going to hit a dead pocket—Mart's detector didn't work. No particular danger—unless you ram something while you're out of control, or let the coils burn out. But they're always good for a thrill."

Cartwright's bewildered mind tried to sum up the details of the last few amazing hours. However, you took them, these people who called themselves Utopia, Incorporated, were a pretty remarkable group.

There was little Worth, with his suave whispering voice and that disquieting satanic grin. Casually marooning himself a quarter of a million miles from the nearest man! If anything went wrong with his flimsy pressure-suit, or his twelve-foot bubble of air—

Cartwright tried not to shudder.

There was Pat Wayland. The super-biolgoist, who contrived to look like a particularly gorgeous and particularly dumb show-girl—and then, if you took her for one, said things that hurt. If she knew about the coming Holocaust, that helped to explain her. But Cartwright still wondered.

Captain Drumm, himself. Splendid and fantastic man of action, who seemed to rejoice blithely in every emergency that called for his calm courage, his strength, and his skill. Those bright-polished boots of his had trodden the mystery of Venus and the deserts of Mars.

And Lyman Galt. The big tired man who was director of mysterious Utopia, Incorporated; the planner of its mysterious Plan. Cartwright wondered about Galt. Was it the torturing knowledge of the Holocaust ahead that had hollowed his dark eyes, lined his weary face?

THE dark shadow of that coiling stellar cloud haunted Cartwright. It was like a monstrous, dark, serpentine thing, crawling and lurking amid his thoughts.

Over and over again, he saw Worth's picture of the end. The last red twilight, and the extinction of the Sun. The months of freezing night. And then the final rain of meteors, that would illumine the ghastly end of man.

What possible refuge could there be?

What Plan could Galt have planned?

Why, Cartwright wondered, had Worth been so evasive about the time that was left? The thought flashed in his mind that all this might be a fraud, to get his hundred and forty millions. Instantly he dismissed the suspicion. Whatever Galt and his asociates were, certainly they were not common criminals.

He did wish, however, that Worth had been more frank.

It was three o'clock in the morning when Captain Drumm brought the *Pioneer* gently down on the terrace outside the Manhattan offices of Utopia, Incorporated. But the lights, inside, were still on. Weary-eyed, Lyman Galt looked up from a mountain of papers on his desk.

"I've seen the nebula," Cartwright told him. "Worth told me about this disaster he expects—though he was too reticent about when he expects it. Now I am ready to hear about your Plan."

Galt's dark, red-rimmed eyes studied his face.

"You are willing to consider investing your fortune in the Plan?"

"If it offers any reasonable hope of escape from the Holocaust that Worth described—I am. But I'm free to say that my pessimism is deep."

"Once, so we are told," Galt said slowly, "when men had warning of a deluge of water, they built an ark in which the seed of life was preserved. Now we are threatened with another deluge—a deluge of fire. In a properly constructed refuge, isn't it possible that men might survive again, and emerge to build a new world?"

His hollow eyes looked musingly far away.

"To build," he ended, "a real Uto-

pia."

"And that—is the Plan?" murmured Cartwright.

Galt nodded.

"Yes. We are going to build a citadel on the Moon. It will be a fortress against all the possible vicissitudes of the Holocaust. In it, we shall preserve the selected flower of mankind, and other life to seed the world again, and a record of all the best things man has done in every field of art and science."

"But can any building," Cartwright objected, "survive the cataclysm that Worth expects?"

Galt nodded again.

"We have been ten years drawing up the Plan, and it is complete." He pulled open a drawer of the scarred desk. "Here are the blueprints of the citadel."

"Wait," said Cartwright. "I've another question to ask—the one that Worth evaded. How long have we to build this citadel?"

"The Plan allows a year."

"That isn't what I mean." Cartwright leaned over the desk. "How long is it before the Earth will collide with the nebula?"

GALT'S broad, frank face twisted with a little expression of pain, and his dark eyes looked away from Cartwright.

"Worth assures me that we have time to carry out the Plan—if we begin at once. Beyond that, he isn't definite. His observations are unfinished, you know."

Cartwright hesitated, shrugged.

"Well, if you can't answer that question, here's another—why build the fortress on the Moon?"

Again Galt looked away.

"For several reasons," he said at last. "First, secrecy is essential, to avoid a useless premature panic. Second, the work can be carried forward more rapidly, under the Moon's lighter gravitation. Third, and most important, the Moon will be a safer location, after the Holocaust begins, because the Earth's gravitational field will catch most of the meteors that would otherwise strike the Moon's Earthward face. Now, the blueprints."

Somehow, that explanation was not quite convincing to Cartwright. There was still an evasion in Galt's manner. But he knew no way past it. Yielding, he bent over the plans.

"The citadel will be built on and under the central peak of Arzachel, where Worth's observatory now stands," Galt told him. "In fact, we'll keep the same observatory, but protect it with a heavier dome."

His thick fingers pointed out a cross section of the peak.

"In this heavily armored building on the peak will be landing facilities for the *Pioneer*, observation rooms, and living accommodations. The greater part of the citadel, however, will be down here, at this point, nine thousand feet below.

"These elevators, through a series of heavy valves, will communicate with the galleries, here. Or vaults, I should say. They will be lined with reinforced concrete — as secure as modern engineering can make them, against every possible disaster.

"These vaults will hold our books, pictures, sound-film containers — all the treasury of modern civilization. Our stores of food and implements will be there, the tanks of water and oxygen, the power plants."

"And how many," inquired Cartwright, "are you going to admit to the second ark?"

Once again Galt looked uncomfortably away.

"Only a small group," he said. "We have not yet settled the exact number." His dark eyes swung back to Cartwright, with a challenging force. "Now," he said, "you have heard the Plan. Will you help us?"

Cartwright met his eyes.

"There's something that Worth didn't tell me," he said. "Something that you haven't told me. If I am going to invest a hundred million dollars in your Plan, don't you think I have the right to know *all* about it?"

Galt's hollow, blood-shot eyes returned his gaze, steadily.

"Believe me, Cartwright, I have told you all I can." He hesitated, and

when he spoke again a huskiness had come into his voice. "I hope very much that you decide to join us."

"THE Plan, of course, will go on —whether you help or not. Drumm is willing to turn pirate, with the *Pioneer*. We have several interesting gadgets that you haven't seen. We can get the money we must have. But we'd lose time, and I'd like to have you, Cartwright, with the Corporation."

Cartwright was slowly nodding.

"I believe you, Galt," he said. "I like your associates, and, after all, I owe them my life. I'm sorry for whatever keeps you from speaking more fully. But I'm with you—all the way."

"Thank you, Jay—for mankind."

"For mankind," echoed Jay Cartwright, softly.

For he thought he had seen, suddenly, the reason for all of Worth's and Galt's evasions. The Utopia Corporation, obviously, could save only a few human beings in that refuge on the Moon. Theirs would be the supreme responsibility of building Utopia, after the Holocaust. For that great task, only perfect human specimens must be selected.

The whole mystery, Cartwright had decided, was simply that Worth and Galt hated to tell him that he wasn't fit to be taken.

It was on his tongue to tell Galt what he had guessed. But a man's dislike of emotional scenes made him keep silent. After all, Cartwright thought, he was not exceptional. If not for those inherited millions, he might have been driving a taxi.

And, if he didn't belong to the flower of humanity, at least he could be big enough to stand back and make room for those who did.

CHAPTER V

The Ideophore

BUT the next day, finding his patient mysteriously exhausted, Dr. Corken ordered Jay Cartwright to Florida to complete his convalescence. Forced to keep silent about his midnight trip to the Moon, Cartwright objected in vain. He carried the appeal to Galt.

"I want to help with the Plan," he told the big tired man. "I'm going to sign the checks, of course. But, besides that, I want to really *do* something."

"All right," Galt promised. "After you come back."

Basking on the Floridian beaches, reading in newspapers the familiar stories of murders, strikes, and threatened wars, Cartwright found that the Utopia Corporation faded into a curious unreality. The night on the Moon seemed a dream, Worth's stellar nebula became a nightmare that he wanted to forget. A doubt arose in him.

Could it be possible that all this world—of people who fought wars and fell in love and worked in factories and made millions and panhandled dimes for cups of coffee and caught the eight-fifty and climbed mountains to see the sunrise and sued each other for divorce and jammed the subways and jumped out of windows and risked their lives for duty and fixed traffic tickets and held up banks and complained about high taxes and played in parks and deliberated in the Senate and looked in shop windows—could it be that all these people were doomed, unsuspectingly, just by a tiny shadow on the stars?

Tanned and stronger, his arm as good as new again, Cartwright carried that doubt with him back to New York.

He found a little cubicle waiting for him in the offices of Utopia, Incorporated. On the desk was a pile of bills, for tools and steel and cement and wages and electrical machinery and books and microfilm copies and scientific instruments, that reached a staggering—and very real—total.

With their story of a huge work in progress, those invoices swept his doubt away. He spent a morning signing checks. When the desk was clear,

he went into Galt's office and said:

"I'm ready for that job."

The big director smiled across his cluttered desk.

"Captain Drumm has been ferrying our materials and labor to the Moon," Galt said. "But really his time is all needed to boss the construction there." His tired hollow eyes studied Cartwright. "Do you want to fly the *Pioneer* to the Moon tonight?"

Cartwright gaped, astonished.

"Tonight?"

"We've a barge load of steel, waiting in the yard at Youngstown," Galt told him. "And Drumm must get back to his job."

"I learned to pilot Delorme's rocket," Cartwright said uncertainly. "But the geoflexor looks terribly complicated, with those dead pockets to get out of, and all. I wouldn't know how to start—not tonight."

SOMETHING made Galt's dark eyes twinkle.

"Pat can fix you up," he said, "with her ideophore."

Cartwright stared at him.

"What's that?"

"You'll soon know from experience—and it's an experience you won't forget. I'll call Drumm, to supply the copy."

Cartwright had not seen Pat Wayland's "offices." Tables in the small rooms were crowded with microscopes, centrifuges, glassware, but most of the equipment was unfamiliar to him.

Pat Wayland herself rose abruptly from a bench covered with the delicate glistening metal parts of some small machine, and several odd-shaped vacuum tubes. Her platinum head was high. She smiled at Galt and Captain Drumm, with a disarming sweetness in her wide blue eyes.

"Yes, this is the convention headquarters," she said limpidly. "And I'm not a bit busy. I was just idling away the time looking for a couple of bugs in the tau-ray. I'm glad you came along—I'll be wanting to test it."

"Now, darling," protested Captain Drumm, "you wouldn't want to make us forget that we love you."

PAT WAYLAND

Her doll-face dimpled to a saccharine smile.

"Just wait and see."

Galt's big brown hand made a little hasty gesture. Cartwright thought that his dark tired face showed a flicker of pain.

"Will you hook up the ideophore for us, Pat?" he asked. "Captain Drumm is going to teach Cartwright, here, how to fly the Pioneer."

"Okay, Chief." Her smile was dazzling. "But the lesson had better be limited to astrogation. If Cartwright picks up any of that honey bee stuff, it's the tau-ray for both of them."

"Don't worry your pretty little head," returned Captain Drumm. "Do you think I want a rival?"

"Remember, Cap," the girl said sweetly, "just what the tau-ray is." Her serene blue eyes smiled breathtakingly into Cartwright's face. "This is the ideophore. Just sit down."

Cartwright stepped back uneasily from the thing she pointed out. It looked disturbingly like an electric chair. There was a huge shining helmet, connected by a heavy cable with a

tall black cabinet on wheels.

"Wha—what is it?"

Pat Wayland beckoned again.

"If you really want to know"—she smiled ominously—"I'll give you five seconds of radio-psychology. Which is as much as a college could teach you in eight years—if any colleges taught radio-psychology."

"Better not take too much at once," Galt advised him, "or you'll have a splitting head. I'll try to explain something about it. You remember the ten-cycle brain waves recently discovered? Well, Pat has found some subtler, higher-frequency brain emanations. The ideophore makes use of them. Briefly, it can be described as an electrical educator.

"KNOWLEDGE and memory, as Pat has proved, are really matters of bipolar moment and intra-molecular potential, within the neurone cells. Her brain-ray pick-up scans that electrical pattern of knowledge, very much as the electron beam scans the photo-electric image in an iconoscope. The process, of course, is far more delicate and complex. But knowledge is converted, in essentially the same way, into electrical impulses.

"Those impulses can be transmitted through a special coaxial cable. They can be amplified, with special electron tubes. And, finally, through a phenomenon that Pat calls neuro-resonance, they can set up new bipolar moments and intra-molecular potentials, in another brain.

"The ideophore, that is, can pick up knowledge from one brain, and transfer it almost instantly to another. There is a delicate system of tuning, which, with the cooperation of the teacher, makes it possible to select the subject to be taught." Galt turned to the girl. "Is that right, Pat?"

Pat Wayland smiled at him.

"You could do with about ten seconds of radio-psychology yourself." She looked at Cartwright, and her platinum head nodded at the ideophore. Reluctantly, Cartwright climbed into the massive chair. There were padded straps for his wrists and ankles. "For your own protection," Pat said sweetly. "There is an involuntary spastic muscular reaction."

The alarming helmet was lowered over his head. Captain Drumm stood behind the chair, with his head between two polished metal plates. Pat took her place at the intricate controls on the wheeled cabinet. Motor-converters hummed, and then a keen ominous whine stabbed into Cartwright's brain.

"Ready," said Pat. "Five seconds of mathematics, and the theory and practise of astrogation. Now!"

Cartwright heard the switch click—and then his world was shattered under an avalanche of agony. A million searing needles probed into his brain. Intolerable flame blinded him. Thunder bellowed in his ears.

He tried to count the eternal seconds. One. And two. But he felt as if the torture had already lasted minutes, hours. His awareness was flung away on a hurricane of flame. He was blanked out.

Then it was over. Galt helped lift the helmet, free his bruised, aching wrists and ankles. Sweat drenched him. He relaxed in the big chair, panting.

"If you want something tough," boomed Captain Drumm, "have Mart Worth give you twenty seconds of astronomy—that would burst a billiard ball. Or try half a minute of Pat's own bio-psychology."

The throbbing ache stilled in Cartwright's head. A few hours later, when he stood beside Captain Drumm at the curved control-board of the *Pioneer*, he was a little surprised to find that he knew the exact function of every dial and wheel and lever.

Without a word of prompting, he checked all the instruments, climbed down through the hatch to inspect the power tubes and the geoflexor circuits in the cramped space beneath the deck, and finally lifted the *Pioneer* smoothly into the twilight above Manhattan.

"I don't understand it." Cartwright shook a bewildered yellow head. "But I know how to fly the ship. Pat's ideophore is a wonderful gadget."

"Pat"—Drumm's voice was grave—"is altogether a wonderful person."

"YOU love her, don't you?" Cartwright looked into Drumm's bronzed face. "Somehow I picked up that impression, along with the science of geodic astrogation."

Drumm's red head nodded soberly.

"My mind must have slipped a moment—it's hard to forget that you love Pat Wayland. I think all three of us do. I try to make a joke out of it. God help you, if you ever leave yourself open to Pat's peculiar humor. Mart Worth never says anything, but he keeps her picture, out there on the Moon. But probably it's the most serious with Galt."

"And how does Pat feel?"

The *Pioneer,* just then, lurched upon the brink of a dead pocket. With a swift and almost unconscious skill, Cartwright returned the geoflexors. With no thought of that vertiginous sickness that had troubled him at first, he brought the little ship past the danger, and looked again at Captain Drumm.

"I don't understand Pat."

Drumm shrugged.

"Who does? The simplest theory is that the woman in her quarreled with the scientist—and the scientist won. My own theory is that she has something in her life that she never speaks about. I don't know—"

He sighed, and the red-uniformed shoulders drew straight.

"You avoided that dead pocket very well, Jay. You can pick up the barge at Youngstown and head for the Moon. I'm going to sleep."

He sprawled himself on one of the long seats against the curving hull, and pulled a rug over him.

Cartwright had wondered how hundreds of workmen and thousands of tons of material were carried to the Moon in the tiny *Pioneer.* Now he knew the answer. They weren't. With far more power than was needed to lift herself alone, the little geoflexor served as a tug-boat of space.

The "barge" waiting by the night-shrouded railway siding in Ohio was a white-painted forty-foot sphere of welded steel. Cartwright dropped the *Pioneer* upon it, made fast a magnetic coupling, waved at a bewildered-looking yard clerk, and then soared up into the night, toward the tarnished platter of the waning Moon.

Four hours later, dropping toward the Moon, Cartwright was amazed at the change that a month—and a few of his millions—had made in the central peak of Arzachel, now a hive of activity. Busy figures in white swarmed over the mountain. Big electric-powered caterpillar shovels had already leveled the mile-high summit. And the excavations were already in progress, for he saw gray slopes of rubble beneath the black mouths of half a dozen tunnels.

A row of white spheres, lying on the pitted crater floor, made quarters for the men. Light awnings covered the machine shops, there. Cable-borne telephers carried workmen and materials to the tunnels and the new mesa above.

Captain Drumm put on a white pressure suit, shook Cartwright's hand, and climbed out of the *Pioneer.* Cartwright uncoupled the barge, picked up an empty, and started back to Earth. Dawn was breaking when he dropped the little geoflexor on its terrace in Manhattan, and took a taxi to his hotel.

THAT night he flew another load to the Moon, and every night. He tried to accustom himself to thinking of the Holocaust. Sometimes, after he had waked and breakfasted in the afternoon, he sat for a little while in the hotel lobby, just watching people.

He couldn't help staring at people, with a kind of horrified fascination. It was terrible to know that all the dates, the deals, the jobs, the shows, the dinners, the shopping tours, the sights, the visits to the Fair—that all those things, seeming so important, meant nothing at all.

Sometimes he was tormented with a wild irrational desire to stand up and scream out the maddening truth: THE HOLOCAUST IS COMING! YOU ARE DOOMED! ALL MEN ARE DOOMED!

But he always held his tongue. Galt was right. It was better that

they should enjoy this unsuspecting happiness, until the end. Sometimes he regretted his own shrewd guess—that he must be left outside the citadel, to perish with these thousands that he watched.

But—and it was fortunate, he knew—he had little time for such appalled reflections. Each nightly flight to the Moon took nine or ten hours. And he spent two hours every afternoon in his tiny office, busy with the details of liquidating his fortune and applying it to the vast demands of the work on the Moon.

His admiration for his companions grew. He often saw Mart Worth or Drumm for a few minutes on the Moon; sometimes one or the other of them came back with him for a few days on Earth. And once Pat Wayland went with him to the Moon, accompanied by mysterious crates and boxes from her laboratory.

The wonders of space were still novel to the girl. Lost in the splendor of far-off stars, she seemed to forget her odd resentment at his own admiration. It was no wonder that the others all loved her.

A few things happened, however, that stirred his old mistrust about the Utopia Corporation. One incident concerned the men sent back from the Moon.

These were laborers who, injured or ill or merely tired, asked to be returned to Earth. They were brought back in the big steel barges, or, sometimes when there were only two or three, aboard the *Pioneer* itself.

And Cartwright was appalled, once, when he asked a hairy dark-faced construction foreman how long he had been at work on the Moon. The man hitched up his overalls and shifted his cud of tobacco and stared.

"The Moon. You plumb crazy, Mister? I ain't never been out of Ohio in my life, till you give me this plane ride."

A few other injuries, among the tired men he was disembarking in the darkness on the outskirts of Youngstown, revealed that none of them had any recollection whatever of the months they had labored on the Moon. And any suggestion of the truth filled them with a curious anger.

That seemed faintly sinister to Cartwright, and he mentioned the matter to Galt.

The big tanned man stood up slowly behind his desk, shaking his unkempt head. It seemed to Cartwright that his broad fatigue-lined face had an expression of deep regret.

"You understand, Jay, that secrecy is essential. We have to preserve it. In the case of these men, or of any of the men involved in our operation, we use another psychological gadget, of Pat's. You have seen how she can put things in your head, with the ideophore. Well, with the tau-ray, she can take them out just as easily."

"THERE'S something, about this," Cartwright said flatly, "that I don't like."

Galt came to him heavily, and took his arm.

"Perhaps I don't, either, Jay," his tired voice said. "But it is the only way." His fingers tightened. "Please, Jay—whatever happens, don't lose faith in Utopia, Incorporated."

Cartwright's faith was very nearly shattered, however, by a newspaper headline. Months had gone. It was spring. The nights had become too short to cover the flights of the *Pioneer*. He had gone to sleeping aboard on the Moon. He got the paper on one of his midnight trips to Manhattan.

NEBULA THREATENS EARTH!

He read the black streamer with a sinking heart. It must mean that months of effort had been in vain. The secret was out. Now there would be panic. Then, reading the story, he stiffened with a puzzled anger.

The end of the world will come by collision with a stellar nebula, according to an announcement made last night by Dr. Lionel Haught, of Mt. Wilson Observatory.

This menacing object, discovered by Dr. Haught, is a huge spiral cloud of gas and meteoric debris, now located in the direction of the constellation Perseus.

All life, Dr. Haught predicts, will be swept from the solar system by the meteoric rains

of the collision. But our generation, he assured reporters, doesn't have to worry about what will happen when Earth meets nebula.

Because that event won't take place—if it does at all—for more than two centuries. Dr. Haught's calculations have placed the probable date of collision as the year 2170 A. D.

Cartwright stared at a blurred halftone. It was the same spiral-armed cloud that Worth had showed him from the observatory on the Moon. And a cold aching sickness grew in his heart.

Galt and the others had tricked him. His guess about the reason for their evasions was obviously wrong. He shook his yellow head, bewilderedly. What was the use in rushing completion of the citadel on the Moon, two hundred years and more ahead of any possible danger?

What, really, was the Utopia Corporation's great Plan?

Now, Cartwright decided grimly, he was going to find out.

CHAPTER VI

The Vault of Sleep

WITH the newspaper crumpled in a quivering hand, Cartwright walked into the office of Lyman Galt. Hollow-eyed with fatigue,

The central peak of Arzachel was a hive of activity (Chapter V)

the big director of the Utopia Corporation looked up from his untidy desk.

Cartwright flung the paper down in front of him.

"Well, Galt." His voice was brittle. "I've come this time to get the truth, all of it. You've put me off long enough."

Galt leaned slowly back in the big chair, lacing brown fingers together over his stomach. His broad brown face twisted into a pained grimace. His lips set, and he said nothing.

Cartwright leaned over the desk.

"I had thought," his tense voice rapped, "that you were evading the truth to spare my feelings—because you had judged me unfit to be saved. But evidently I was mistaken. There have been a good many things I didn't understand, and several that I didn't like. Now—if you want my John Henry on any more checks—just what, really, is your Plan?"

For a long time Galt's hollow, red-rimmed eyes stared fixedly at Cartwright. At last he nodded, as if in decision. His fingers unlaced. A big brown hand fumbled unconsciously in his pocket for pipe and pouch.

"I've been wanting to tell you, Jay," he said. "When you hear, you'll understand my hesitation." He gestured with the pipe-stem. "Sit down, Jay."

Cartwright pulled the chair up close.

"Haught's conclusions are surprisingly accurate." Galt touched the black headline. "Worth's own date for the Holocaust is also 2170. That means we have about two hundred and thirty years to carry out the Plan."

"If we have over two hundred years," Cartwright demanded, "why are you rushing to complete the citadel in one?"

"When the Holocaust comes," Galt said soberly, "the citadel will be no use at all. The surface of the Moon, like that of the Earth, will probably be fused to a depth of thousands of feet. Men can't live under seas of molten lava."

He made an ominous little gesture with the unlit pipe.

"No, Jay." His dark head shook. "There is nothing at all, in the present state of scientific advancement, that offers any hope whatever of survival through the Holocaust." His voice rang hollowly. "If the Earth passes through the nebula, it will emerge a sterile planet."

"But perhaps," Cartwright put in hopefully, "science, in two hundred and thirty years, will advance far enough to do something about it."

Galt's unkempt head shook again.

"I don't think so—not without our Plan." His big hand opened the newspapers. "Look here. Nothing but unemployment, graft, strikes, war. No, Jay, the tide of civilization is ebbing again.

"There is another Dark Age ahead—an age of want and pestilence and war and ignorance and degraded barbarism—unless we carry through our Plan."

"Well?" Cartwright leaned forward. "What *is* the Plan?"

GALT laid his pipe on the littered desk.

"If you didn't know Pat and Worth and Captain Drumm—if you hadn't seen the ideophore and the *Pioneer* and the beginnings of the citadel—you would scoff at the Plan. But I think you have been prepared."

"I'm expecting something pretty remarkable," Cartwright admitted. "Let's have it."

Galt rose, with an odd and somehow ominous little smile.

"We have a barge load of equipment and chemicals ready to go to the Moon," he said. "I'll send Pat out with you, to demonstrate exactly how the Plan is to work."

Some grave undertone in his voice sent a tremor up and down Cartwright's spine.

"Can't you just tell me? Now?"

Galt beckoned him inexorably toward the door.

"Pat will be ready in half an hour."

Cartwright waited impatiently on the terrace, above the lights and the subdued endless sound of the city. Pat Wayland appeared at last, stumbling under a huge carton marked "Fragile." He helped her with it, and she thanked him with a sweetness that,

for once, seemed unalloyed with poison.

"Now?" he said. "About the Plan?"

"Don't ask questions," she advised him sweetly. "I'll show you, on the Moon."

"All right," he said. "But no more tricks."

The *Pioneer* lifted above the city's sprawling lights. Softly drumming, it settled into a roofless abandoned warehouse in Newark, to pick up the loaded barge. As it boomed away, toward the Moon, Pat Wayland stood near Cartwright, looking into space.

"Splendid, isn't it, Jay?" Her voice was soft with awe. "It's terrible and inspiring and beautiful. Perhaps, if our Plan goes through, men will live to look upon it for a million years. Perhaps they will even become a real part of it, and not just a few insignificant vermin clinging to a mote of dust."

The throb of the geodes abruptly faltered. The little ship lurched, at the edge of a dead pocket, so that the girl was flung against Cartwright. As his hands moved, with a practiced and almost unconscious skill, to keep them out of the perilous dead area, he was aware of the warm vibrant contact of her body. Her blond fragrant hair brushed his face.

She laughed, softly, with a murmured apology.

"You know, Jay, this is like one of those rides at Coney Island."

He caught her arm, steadied her.

"Pat," he whispered, "you're human tonight. I really believe you have a heart."

Her blue eyes went dark with pain.

"I had one," she said softly. "Once."

"Don't you think you could find it again?" He saw her sharp little gesture, and went on hastily. "Even if not for me—though you must know I love you, Pat. I tried not to fall for you—I knew it would be no dice. But—I do love you."

He saw her face, in the pale rays of the growing Moon, and it was stony white.

"Don't any of us have a chance?" he asked her. "You know that Drumm loves you—and tries to hide it, with his banter. Don't you know that Mart Worth treasures your picture, among his astronomical plates? Don't you realize that Galt is eating his heart out for you—and never saying a word?"

"Do you think I don't know?"

THE little sound she made began like a sob, but it ended with a little silvery laugh. Cartwright shrugged, wearily.

"All right, Pat. If you want to be the goddess of science—go ahead!"

Her smooth face flushed, and wrath smouldered in her eyes.

"When you are angry," he told her, "you look more beautiful than ever."

"Cliché." Her voice had its old infuriating sugar-sweetness. "Perhaps Drumm should give you another lesson, with the ideophore. Now, I've work to do."

She went back to the folding desk at the rear of the deck, and Cartwright tried to keep his mind on the job of taking the *Pioneer* safely out to the Moon.

"Whatever bit Pat," he told himself, "it wasn't the love-bug." He stared at the mottled, expanding globe ahead. "Or maybe it was!"

The *Pioneer* dropped toward the stark, high-walled plain of Arzachel. Thrusting out its black triangle of shadow, the central peak lifted swiftly.

The citadel, during these months of labor, had taken swift form. An immense disk of white concrete crowned the flattened summit. A smaller disk, upon it, left a circular terrace. The dome of Worth's observatory rose from the center of the upper disk.

Cartwright set the white barge upon the lower terrace. Stevedores in bulky white suits swarmed out of valves in the curving wall, to unload it. He dropped the *Pioneer* in its own cradle, locked and sealed the valves, and grinned back at Pat.

"All right, diamond lady," he said. "I'm ready to be told about your Plan."

Captain Drumm and Martin Worth were waiting for them in the corridor within. Magnificent as ever in a new

crimson uniform, Drumm seized the girl's hand.

"Welcome, darling, to our little love-nest on the Moon. We've got your room all decorated. It is pink, with a frieze of Cupids —"

"Wouldn't you like it for yourself?" Pat asked sweetly. "But—is Jay's room ready?"

"Eh?" It seemed to Cartwright that Captain Drumm and the little astronomer looked at one another with something like consternation. "Of course —but why?"

"We must show it to him," the girl said, limpidly. "It seems that Jay has been asking some questions about the Plan, and Lyman agreed to let him have a demonstration."

"Oh!" The voice of Captain Drumm sounded queerly hollow. "Of course."

Cartwright glimpsed the sharpened V of the little astronomer's brows, his expression of satanic amusement. Suddenly Cartwright shuddered. He couldn't help feeling that something was very much wrong.

"Well, darling, see you afterwards," said Captain Drumm. He added, too hastily, "Both of you, of course."

Grinning sardonically, Worth lifted his thin hand in a little parting gesture.

"This way," said Pat Wayland. "The vaults are the first thing you must see, and they are nine thousand feet below."

UNEASILY, Cartwright followed her into the small cage of an automatic elevator. It dropped, free. Cartwright clutched a hand rail to keep from bumping his head on the ceiling.

"See here," he demanded again, "why can't you just tell me about all this?"

"You'll understand," she promised him blandly. The innocent sweetness of her smile seemed a little over done. "When I tell you that we are going to live here, in the citadel, until the Holocaust comes—"

He stared at her.

"Ourselves? Live two hundred years?"

Her blond head nodded.

"We discovered, on the first trips here, that the lesser gravitation causes subtle psychological changes. There is a slowing in the rate of metabolism. Not at first pronounced, but I have discovered a gas that increases the effect. A rather complex organic compound. We call it the sleep gas."

The elevator stopped. Tense with a growing alarm, Cartwright followed the girl out into a narrow hall. The walls of it were gray concrete. Their massiveness made him feel the weight of the lunar mountain above.

Set close together in the wall were a row of heavy doors. They were green-painted steel, set with bright chromium knobs and dials. They looked like the doors of bank vaults. Each of them, Cartwright saw, was painted with the name of one of his associates, Galt, Drumm, Wayland—

He stared, in a cold apprehension, at his own name.

The girl stooped, spun the dials.

Cartwright was frightened. He wanted to run back into the elevator, and leave her here. But he tried to put aside the fear. After all, he admired Galt and Worth and Drumm. He had trusted them. And he loved Pat Wayland.

"These doors seal," the girl was saying. "There are clocks, and automatic valves to control the flow of sleep gas and breathing mixture. We will be able to survive in these vaults —with intervals outside—until the year of the Holocaust."

Cartwright repressed another shudder.

"But still—I don't see what this has got to do with the Plan."

Smiling innocently, the girl opened the massive door.

"I'll explain everything, as we go along. Now, have a look at the room where you are going to spend the most of the next two centuries."

Cartwright followed her unwillingly into the narrow, gray-walled cell Alertly keeping between her and the door, he quickly surveyed it—and shuddered.

It was very much like a prison cell. There was a bunk, a chair, a little table. On the table were a wash basin

and several sealed bottles of water and some cans of food. At the foot of the bunk was a ventilation grille in the wall, with a fan behind it.

Pat Wayland's light hand touched his arm.

"Cozy, eh?" Her voice had a silver trill. "Everything you need."

His arm stung, under her hand. He saw the bright needle in her fingers, and felt a swift-spreading numbness. A frantic desperation moved him toward the door. But that racing numbness seized his limbs, and he toppled.

PAT WAYLAND caught him, pushed him across the bunk. He tried to fight, to stand. But he couldn't move any more. He saw her dimly, standing at his feet, smiling down sweetly. The little needle glittered, as she waved at him.

A far thin whisper, he heard her voice:

"Sweet dreams, Jay!"

The strange paralysis that held him was a wall of pure horror. She was going to leave him here. She was going to put him to sleep, with that gas. He was going to be buried alive, under that mountain on the Moon.

But why? His dead lips strove in vain to ask that question. Why hadn't the Utopia Corporation played fair with him?

How long? He struggled desperately to speak. Must he lie buried here for months and years? Perhaps even for centuries, until the Holocaust had come?

No sound came. He couldn't move. And suddenly he saw that the girl was gone.

Dully to his ears there came a hollow, thunderous clang. It was the great door, closing. The light above his head went out. He lay in utter darkness, utter silence—in the dead heart of a dead world.

Then there was a faint whispering. He knew it was the gas. It had a queer, pungent sweetness. Somehow, it was soothing, relaxing. It smoothed away his terror. His drumming pulse slowed. It was a long time before he needed to breathe again.

He slept.

CHAPTER VII

The Ray of Oblivion

IN HIS drowsiness, Jay Cartwright felt an odd reluctance to awaken. He wanted to sleep on—on—

But a fan was whirring. It blew fresh cold air against his face. And someone was beside him, calling him to get up.

The calling voice seemed dimly familiar. He tried to forget it, to relax again into pleasant oblivion. But it insisted. And suddenly he knew it. It was the voice of Lyman Galt.

Galt! The name set up a clangor of alarm in him. Abruptly he remembered the vault under the Moon. He recalled how lovely Pat Wayland had lured him into it, paralyzed him, closed the great door.

Panic broke the web of sleep. The aromatic gas, he realized, was gone. He made a convulsive effort to break that numbing paralysis, and found that it had left him.

Sitting up on the bunk, he rubbed at his sticky eyes. His garments had been changed, for a loose white robe. He explored his itching chin, and found a short stubble.

"Well, Jay. How are you?"

He peered about the narrow, gray-walled cell. His eyes cleared, and he found Lyman Galt. His face looked thinner, hollowed, bleached a little, as if he had been ill.

"I'm all right—I guess I am," Cartwright muttered. "But I don't like this, Galt. Pat tricked me in here, and put me to sleep. This beard"—alarm cracked his voice—"how long have I been here, Galt?"

"Five months, nearly," Galt told him. "That was April, and this is August."

"Five months!" Cartwright blinked and stared. "Why did you do this to me, Galt?" His voice was bitter. "I trusted Pat—trusted you all."

Galt shook his dark head, regretfully.

"I was just afraid you wouldn't understand, Jay," he said. "This was the

simplest way to take care of your objections. Besides, Pat wanted a human guinea pig, for a final test of her sleep gas—and it seems to have worked splendidly."

Anger shook Cartwright.

"Do you think it was fair to me?—to keep me in the dark, trick me? Remember, I paid the bills for half your mysterious Plan."

"For all of it, Jay," Galt told him. "You remember, there was a power of attorney. We sold the last of your securities, a month ago."

"What?" Cartwright swayed upright, trembling. "So it was robbery, after all? Just a clever plot—" He bit his quivering lip. "I put my faith in you, Galt. I liked you and Drumm and Worth—loved Pat. And you all conspired to rob me."

"Wait, Jay." Galt caught his arm. "Don't judge us, yet." He hesitated. "You see, we have done something else—something that will be harder for you to accept than anything you know."

"And what is that?"

"Fly me to Earth, in the *Pioneer*," Galt told him. "And you will see."

THE automatic elevator whisked them upward, to a curving corridor in the upper level of the citadel. A silence, complete, dead, pressed crushingly upon them. Cartwright spoke of it uneasily, and Galt said:

"The citadel is finished. All our workmen have been carried back to Earth. The working of the Plan has begun."

They came into a wide, white-tiled kitchen. Small heavy round windows looked out into the lunar night. The pitted convex floor of Arzachel, a mile beneath, was gray in the pale Earthshine. Vague and mighty, the distant rampart of the crater wall loomed against the sharp-etched splendor of the stars.

Pat Wayland and Captain Drumm were sitting at a little table, over toast and coffee. The blond girl looked up at Cartwright, and her blue eyes smiled serenely.

"Hello, Jay," she said sweetly. "Sleep well?"

Cartwright gulped angrily for his voice.

"Watch your step, darling." Drumm leaned back, and laughed at the girl. "Jay might wake up first, sometime."

Galt had opened the door of a huge refrigerator.

"Hungry, Jay? It's five months, remember, since you ate. Even with damped metabolism, you have a right to an appetite. What will it be?"

He began breaking eggs into a sizzling pan, and Cartwright forgot his anger in a sudden awareness of gnawing hunger. Looking at a big clock on the wall, Pat rose—it was an odd clock, Cartwright noticed, with extra hands for months, years, and centuries.

"I must get back to the tau-ray," she said. "Mart offered to watch the projector while I ate. It has been on eight hours. Moving, just now, across Europe and Africa. We'll let it run twenty-five hours, just to make sure."

"Pat—"

There was an odd note of urgent appeal in Galt's deep voice. He moved to follow the girl.

"Pat—Jay and I are going down on the *Pioneer* for a little inspection tour. I want to show him how the Plan is working."

"The same old song." Her laugh was a silver mockery. "Won't young Cartwright be surprised?"

"Pat," Galt said huskily. "Please!"

Suddenly her voice was grave.

"Remember—don't leave the ship. Aboard, you'll be safe enough. The lead-glass filters on the ports will absorb the tau-ray. But don't leave the ship."

"Of course." There was a little choked break in Galt's voice. "And Pat—Pat—"

The girl came back toward him. Her blue eyes were wide, wondering.

"What is it, Lyman?"

Galt stared at her for a moment. His dark lip trembled. Suddenly he gulped a deep breath, and made a little shrugging gesture.

"Nothing, Pat. Nothing. I'm sorry. Good-by."

"So long, Chief." The round perfection of her arm made a careless

Captain Drumm's paralysis gun toppled four more men (Chapter IX)

little gesture. "You've just time to see the ray strike America. Just remember—stay aboard the ship."

Devouring scrambled eggs and bacon, buttered toast and jam, a huge bowl of cereal drowned in canned milk, Cartwright suddenly observed that Galt had not touched his own plate. His hollow eyes haunted the door where Pat had gone out.

"GOOD-BY," Cartwright heard him whisper faintly, "dear Pat."

An abrupt sense of alarm ended Cartwright's appetite.

"I'm ready," he said. "Let's go."

As they passed another small round port, Cartwright glimpsed a queer machine on the curving terrace outside. Thick cables writhed to the end of a great cylinder that glowed with a peculiar, penetrating violet.

That ominous shining tube was pointed like a telescope—or a weapon—at the huge brilliant half-risk of the Earth. Pat Wayland, hardly recognizable in her heavy white armor, was peering through a guide telescope beside it.

"The tau-ray projector," said Galt.

"What—" Alarm choked Cartwright's voice to a whisper. "What is it doing to the Earth?"

"We shall see," Galt told him solemnly, "when we arrive."

Through the three hours of the

Earthward flight, Galt seemed grave and troubled. He strode up and down the tiny deck, sometimes peered absently out at the star-dusted splendor of space, once sat down at the little desk and scrawled out a brief note.

The waxing Moon slipped down behind the curve of the planet, as they dropped into the upper atmosphere. The dim green vastness of North America spread westward. At last Galt stirred himself, to speak:

"Land in Times Square, Jay. We'll wait there till the Moon rises—that will be almost exactly noon—and watch it happen."

Cartwright fought a little shudder of numbing unease.

"In Times Square?" He remembered all the night flights of the *Pioneer*, when he had raced to keep the little geoflexor under cover of darkness. "At noon?"

Galt shrugged, his manner oddly solemn.

"I don't suppose that many people will notice us at all," he said. "It doesn't matter if they do—for they'll soon forget."

His hands trembling a little on the controls, Cartwright brought the little silver ship down toward the long island of Manhattan. Below the green rectangle of Central Park, he followed the long diagonal slash of Broadway.

"Eh!" he muttered. "Something's wrong!"

He looked anxiously at Galt. The big man, peering out with hollow eyes, seemed to see nothing at all. But the streets were jammed. Traffic was snarled in knots at every intersection. The sidewalks had overflowed with frantic pedestrians. Times Square was a sea of tight-packed humanity.

Cartwright brought the *Pioneer* down gently, beside the old Times Building. The crowd surged away to make room for it to land, then the pressure of the throng crushed men and women back against it.

"They're all frightened," whispered Cartwright. "Horrified! What can be wrong?"

Galt's hollow eyes stared fixedly, unseeingly, out.

"Wait," he said dully. "It's only a few minutes until the rising of the Moon. Then you will see."

Cartwright started back toward the entrance valve.

"I'm going out, and ask them."

WITH a sudden, frantic movement, Galt seized his arm.

"Don't do that," he said urgently. "You heard Pat's warning. The *Pioneer* is armored against the ray. We're safe, aboard. But you must not leave the ship."

"My God—why don't you *tell* me?"

Galt shook his haggard head, and Cartwright turned to look out again. A newsboy came into his view. He tried to read the screaming headline on the paper the boy held up. But it was snatched away. The boy's whole bundle was seized, torn from hand to hand. A tall man backed against the *Pioneer* to guard his prize. Cartwright leaned anxiously against the port to read:

SILENCE SPREADS ACROSS ATLANTIC MAY REACH HERE AT NOON

That mysterious belt of silence, which last night suddenly cut off all communications with the Far East, is steadily advancing westward. The last cable from London was dispatched at seven o'clock this morning (noon, London time). Reports from Atlantic shipping have since been ceasing, as the belt moves westward with nearly the speed of the Earth's rotation.

Science has yet offered no satisfactory explanation of this disturbing phenomenon. It is hoped that the inexplicable failure of communications does not mean loss of life. None of the interrupted messages seems to hold any clue whatever. Meteorologists doubt that the cause could be an electrical storm, for radio and telegraph facilities in the Western Hemisphere have not been affected. War Department officials refuse to comment upon conjectures of a new military device.

As the noon hour aproaches America, panic is mounting in metropolitan districts. Municipal and Washington officials, however are broadcasting reassuring statements. Other than the silence, no cause of alarm has been observed—

A weeping woman snatched the paper away, peered at it with an expression of desperate hope. She flung it from her, and picked up a small bewildered child in her arms. She clung to the child. And her wet

eyes lifted toward a great clock, that was part of a sign.

A silence had stilled all the uneasy murmur of the crowd. It was a terrible, breathless, frightened silence. A hundred arms were pointing at the clock. Thousands of tense white faces stared at the hands of it, closing together like the blades of a mighty pair of shears.

Dimly, far back in his bewildered mind, Cartwright tried to remember something about another pair of shears, with which somebody had snipped the life-threads of mortals, when their fated hour had come.

The hands were together.

Nothing happened. For a long, dragging minute, nothing happened. People began to look again at one another, smiling hopefully. It was nothing, after all. A wave of cheering rolled down Broadway.

The great hands drew apart, and it happened.

ABRUPTLY, as if life had been mysteriously withdrawn from them, the cheering thousands toppled. They fell like grain that is cut by the sickle. There was no sound. There was nothing in the sky. No visible agency touched them. But, as far down the streets as Cartwright could see, they toppled into endless heaps and windrows.

Reeling with a cold numbing sickness of horror, Cartwright put his hand to his eyes. He stumbled away from the port. He stared quivering at Galt, who was still looking out unseeingly.

"So this is what your tau-ray has done?" he said hoarsely. "You have used it to murder the world!"

CHAPTER VIII

Forgetfulness

BUT Galt shook his head.

"They aren't dead." His trembling fingers touched Cartwright's shoulder, and he pointed through a port. "See. They are living, moving. They are only . . . forgetful."

Cartwright pressed his face against the small round port, staring. He was held in a shuddering fascination. For, as far as he could see, up and down Broadway and Seventh Avenue and 43rd Street, the fallen multitudes were moving.

Their motion was dreadful to see.

Swaying with a sickness of revulsion, gripping the brass rail with clammy hands, Cartwright watched those nearest him, on the pavements of Times Square.

They rolled. Their eyes stared, unfocused, blank with an utter stupidity. They made mouthing, hideous grimaces. They kicked out their arms and legs, with aimless sprawling gestures.

Sometimes one of them made a clumsy effort to pull himself upright. But always he lost his balance, and sprawled again across his neighbors.

A terrible silence had fallen, as they toppled. They had lain at first in such a stillness that Cartwright had thought them dead. But no sound came from them again.

It was a mumbling, inarticulate babble. Here and there a thinner sound cut above it—the sound of wailing. For men and women were screaming like frightened infants.

Cartwright looked mutely again to Galt. His stomach felt very sick. He tried to fight down the cold nausea of horror rising in him.

"You see," Galt said, "they have forgotten."

Stupidly, Cartwright parroted:

"Forgotten?"

Galt nodded again, and regret was solemn in his eyes.

"They have forgotten everything they ever learned. They have forgotten how to walk, and how to talk. They have forgotten all the strategems and devices that they had learned in the Old World."

A strange elation lit Galt's face.

"All the mental scars, that they got in the jungle of the Old World, are healed now. They are young again. They are infants. Only the primary reflexes, with which they were born, survive."

"I see." Cartwright nodded, sickly.

"The ray destroyed their minds."

"Not their minds—merely their memories. They can learn again. Far more swiftly, in fact, than they learned as actual infants. Because learning will not have to wait upon muscular and neural development."

"And you did it with the ray?"

"With Pat's tau-ray," Galt told him. "It is a penetrating actinic radiation, whose effective frequencies are carefully synchronized to disrupt certain proteid molecules in the nerve tissue. One product of the break-down, formed in minute quantities, is a subvital, self-propagating virus.

"The ray is quite invisible. But a flash of it, against the retinal cones, or even against the nerve-endings in the skin, is enough. Within a few seconds, the virus has pervaded the entire nervous system.

"The effect is only a slight, temporary change in the myelin nerve-sheath. Slight, chemically speaking. But its effect, at the synaptic junction of the fibers, is to destroy all learned associations. The memory of the individual is blotted out."

THE interior of the little *Pioneer* seemed to spin around Cartwright. He grasped the handrail, and tried to believe that all this was an insane, impossible dream. But he still saw the stricken thousands outside, wallowing in a dreadful dumb helplessness upon the pavements of Times Square.

"You have done this to—everybody?" he whispered. "Everywhere?"

"That was necessary." Galt's great shaggy head nodded solemnly. "None must escape, save our chosen ones in the citadel. That is vital to the Plan."

An iron determination, in his deep weary voice, rang terrible to Cartwright.

"For not one trace of the Old World's corruption must be left, to poison our new Utopia!"

Cartwright gulped twice, before he could speak.

"But this is murder, Galt!" His tight voice quivered. "Don't you see—everything will stop. Transportation, manufacture, farming. Don't you see what will happen?"

Galt's dark face was bleak.

"I suspected that you would feel this way about it, Jay," he said. "That is why I kept putting off any revelation of the Plan."

"Well?" Cartwright gripped his arm. "Now that you've done this, just what is your magnificent Plan? You have reduced all the human race to gibbering helpless idiots." He laughed bitterly. "What next?"

"Gibbering, perhaps," said Galt. "Helpless. But not idiots. They are infants. Children, who may grow up to build a more splendid world than the old one could ever have been.

Cartwright shrugged impatiently.

"A world of babies—what is to keep them all from perishing of hunger, before they even learn how to eat?" His voice rang hard. "Remember, Galt, our own civilization has been—had been a hundred thousand years in the making. And you have wiped it out."

"If the Old World had progressed no farther, in a hundred thousand years" Galt said softly, "don't you think there must have been something wrong with it?"

He straighted, until his dark head almost touched the dome of the *Pioneer's* hull.

"Listen, Jay—the reason for our plan is the coming Holocaust. Men have just a little more than two centuries, before the Earth plunges into the nebula. That is the end—unless something can be done.

"I don't know how the Earth can be saved. I don't know how any men can survive. Clearly, the only hope is in some splendid spurt of scientific progress. I can't guess what the solution would be, but I believe that a great enough science could find a way to save the Earth.

"The Old World, as things were going, was obviously doomed to fail. It was economically sick. Wars were sapping its strength. It had no morale—and no care for the future. The final discovery of the nebula meant only another scare-head in the newspapers. That is why we planned a new beginning."

"WELL?" said Cartwright. "Men don't know enough to save themselves—so you make them forget the little they know. Now what do they do?"

"They build Utopia."

A solemn strength moved Galt.

"You have seen only the Plan's first step. The tau-ray leveled the old ramshackle building. Now we will help them build Utopia, upon a new foundation."

"Help them?" Cartwright turned shuddering from another glance outside. "If we could—but how?"

"The minds of men are all swept clean," Galt said. "But in our citadel on the Moon we have all the good and useful things the Old World had learned. We shall teach the Utopians what they should know, with the ideophore."

"The ideophore?"

Staring, Cartwright felt a tremor of hope.

"Pat has designed a portable unit," Galt told him. "We have made up a series of records for it, on steel ribbons, that contain the fundamentals that men must be taught. The foundations of Utopia.

"We must return, when the ideophore has done its work. We shall select individuals, here and there, all over the Earth, and educate them with the ideophore to be the leaders of the race. The guides toward Utopia.

"When the seeds of Utopia have been planted, we shall return to the citadel on the Moon. We shall sleep in the vaults there, for a generation. And then we shall come back to see the progress of our plant.

"And so, every generation, we shall visit the Earth—until the Holocaust comes. Perhaps to aid the new science of Utopia with some forgotten fact. Perhaps to spur men on with some new reminder of the doom to come."

"So we are to be gods?" Cartwright laughed again, bitterly. "Eternal beings, dwelling apart in our scientific fastness on the Moon? Condescending to walk, now and then, among the poor struggling mortals below?"

"Who will soon," Galt said, "become greater and wiser than we ever were—if the Plan succeeds. But don't say that we are gods, Jay." He shook his head. "Say, rather, that we are surgeons."

He nodded, deliberately.

"Surgeons—that's it. We have diagnosed the sickness of mankind. We saw that death was the prognosis. The thing that we are performing is a dangerous and painful but necessary operation. It offers the sole hope of survival."

He gripped Cartwright's arm.

"Now, Jay," he said anxiously, "do you see? I hope you understand—because a great deal depends on you, Jay."

Cartwright shook his yellow head.

"I see what you're trying to do," he said. "I think you were mad, to try it. Now there can be no turning back—but it still looks to me like burning down the house to kill the rats."

"No." Galt smiled, wearily. "But to build a temple in its place." He took Cartwright's hand, in a crushing grip. "Let me congratulate you, Jay. For you are to be the master builder."

"What?"

Cartwright stared at him, puzzled. He saw the redness of Galt's hollow eyes, the fatigue-etched lines in his face, the weary droop of his great shoulders.

"JAY," Galt's tired voice rumbled softly, "I've worked ten years to perfect the plan. Eighteen, sometimes twenty hours a day. I'm tired. And — well —" A shadow of pain crossed his dark face. "There's a thing that I've got to forget. I'm going to step into the background, Jay. And you are to take my place."

"Eh?"

Cartwright was bewildered, voiceless.

"I trust you, Jay." Galt squeezed his hand again, released it. "Please forgive all the deceptions to which I was forced. And now—are we ready to take off for the Moon?"

"In half a minute." Cartwright stared for a moment; something in Galt's manner puzzled him. "I must

inspect the geodes."

He lifted the narrow hatch cover, climbed down into the machine-crammed space beneath the deck. He was stooping over a big power tube when the clang of the air-lock reached him. With a mute, protesting cry of comprehension, he stumbled back above.

Lyman Galt was already outside. Swaying wearily on the pavement, he looked back up through a port. His hollow face grinned, and he began a little tired gesture of farewell.

But the grin faded from his face. All the bitterness and fatigue and pain, that had dwelt there so long, went with it. There was left only a pleased baby-smile.

For a moment he stood there, smiling that smile of vacuous contentment. Then he tottered. His legs buckled. He made a clumsy aimless gesture, and sprawled helpless among the others on the pavement.

Jay Cartwright checked himself, at the valve. If he opened it, he too would fall. The Plan would fail. Galt, and all these sprawling millions, would perish miserably. The Plan was now the only hope. The Plan must go on.

Fighting a cold sickness of bewilderment and horror and despair, he started the booming geodes, and lifted the *Pioneer* back toward the fortress on the Moon.

CHAPTER IX

The Law of the Four

THE great tube of the tau-ray projector was still glowing with its painful violet, on the terrace of the white citadel. Captain Drumm was standing beside it — instantly recognizable, because he had decorated his white pressure-suit with stripes of gold-and-crimson braid. He waved a bulky arm.

Cartwright anchored the *Pioneer* against the entrance lock, opened the valves, and clambered wearily through into the fortress. He found Pat Wayland, waiting in the curving corridor.

"Lyman," she called anxiously past him. "How is the ray working? "Lyman?" When no answer came, she turned a n x i o u s l y to Cartwright. "Where is he, Jay?" Her voice quivered. "Has anything—"

She bit her full red lip. Her blue eyes turned dark. The smooth perfection of her face went pale. She shook her gleaming platinum head, with an abrupt frantic denial.

"He *couldn't*—

She confronted Cartwright, whispering:

"Speak, Jay. Tell me."

Dully, Cartwright shook his yellow head.

"You know, Pat," he said softly, "sometimes you're human. Mostly, you're just an adding machine, with a dash of paint and one of poison. But sometimes you really act like a human being."

Frantically, her tense fingers dug into his arm.

"Tell me — what has happened to Lyman?"

"He loved you, Pat—you know how it was." His voice was harsh, almost brutal. "And he got tired of loving you. I know exactly how he felt, because I fell for you myself. Well, he doesn't love you any more."

His laugh was a sharp, bitter sound.

"Because he has forgotten," he said.

A white hand flew up to her throat.

"You mean—he—"

She went voiceless, and Cartwright nodded grimly.

"Lyman walked out of the *Pioneer*, into your wonderful tau-ray. Now he is like the rest of them. He is a wallowing babbling idiot, who cannot stand or speak or feed himself. And he doesn't love you any more."

Tears glittered suddenly in her huge blue eyes.

"Don't say that, Jay!" Agony was keen in her voice. "Don't be cruel—"

"Cruel?" His voice rasped at her. "Who has been cruel? Galt can't tell you now. But I can, Pat. Mart Worth can. Captain Drumm can."

She pressed both hands hard against her quivering white face.

"Jay, you don't understand." Her

voice was muffled, shaking. "You don't know what has happened to me, to make me what I am."

"I know what you did to Galt."

"Please, Jay—please." A sob. "I liked Lyman, tremendously. As I do Mart and Cap and you. But love is a book that I have closed, forever. It only hurts me, when you speak of it. So—*please!*"

Suddenly gentle, Cartwright touched her shining hair.

"I'm sorry, Pat," he whispered. "Forgive me."

"Of course, Jay. And don't think that I'm not sorry." Her pale face was stiff and bleak with pain. "But I just can't help it."

CARTWRIGHT jerked his yellow head.

"Anyhow, we've got a job to do—if we are going to do anything for Lyman and all those millions, back on the Earth."

Slowly, the girl nodded her platinum head.

"Yes, we must go on," she whispered. "For his sake, now. Come on in the kitchen. I'll phone Mart and Cap to come, and fix them a bite to eat. The ray has only a few hours more to run."

In the wide white kitchen, whose round windows looked out over the

The assagai ripped into the belly of the rearing horse (Chapter X)

convex crater floor and the ringing mountain wall that loomed tremendous in the pale Earthshine, Cartwright told the others what had happened in Times Square.

Little Worth's black brows raised to make a sharp V. His thin pale face was twisted with a bitterly sardonic amusement. His small bright eyes followed Pat Wayland, mockingly.

"Yes, Lyman was tired," he said softly. "He wanted to forget."

For a moment Cartwright thought that the girl was going to burst into tears. Then her platinum head tossed abruptly. The old dazzling smile lit her round doll-face.

"Isn't it so?" Her cooing voice was honey-sweet. "We, all of us, have so much to forget."

Then the two men turned to Cartwright.

"Lyman had told us, Jay," said Captain Drumm, "that if anything happened to him, he wanted you to take his place as leader of the Four."

Cartwright's yellow head bowed.

"He asked me to," he said slowly. "I don't know why. Each one of you knows ten times more than I do, about how the Plan is to work."

Soberly, for once without his satanic smile, Martin Worth said:

"I know, Jay. We have a new world to build. To do that, we need a man like Galt was—and like you are. A leader, with the common touch. All the rest of us are specialists, with the usual bias of experts.

"I would probably make a world of astronomers, sitting about and predicting cosmic cataclysms. Pat would make them psychologists, busy picking one another's repressed egos to shreds. Drumm would turn them into a legion of rainbow-uniformed adventurers. We need you, Jay—a man like you—to lead us all toward the goal that Lyman mapped out."

Pat nodded agreement, and Drumm took Cartwright's hand.

"I'll do my best," Cartwright promised. "And now shall we load the *Pioneer* with the equipment we are going to need, and get ready to tackle our job?"

Another day was breaking over New York when the little geoflexor dropped back into Times Square again. Pat Wayland and Worth and Drumm were busy about the portable ideophore, which had four helmets attached by flexible cables to its compact case.

"We'll find Galt, first," Cartwright told them. "Perhaps the educator will give him wits enough, at least, to save his life."

"It would be fitting," the girl agreed softly, "if we can make him one of the leaders who will guide mankind toward the Utopia that he planned."

The little ship touched the pavement.

"THIS is where I left him." Cartwright was peering anxiously out, and a sudden apprehension choked him. "But he—he's gone!"

He had left the stricken multitude sprawling, helpless as new-born infants. But now the most of them had already learned to move about—somehow. Dim figures were crawling and swaying unsteadily through the gray dawn.

"I thought they couldn't move," whispered Cartwright. "I left him—lying—"

"They will all learn very rapidly," Pat Wayland said. "There is no impairment of nerves or muscles. All they need is a re-establishment of the neural patterns. The Plan depends on that."

White-faced, she peered out.

"He must have wandered away."

"We must find him," whispered Cartwright. "Help him. This is—horrible."

He stared at the unsteady figures moving in the increasing light. Some of them had already learned to eat. In front of a wrecked refreshment stand, he saw a little snarling group struggling clumsily over raw frankfurters and bits of bread.

He saw a man-thing in police blue snatch a gold watch, and bite it, and throw it disgustedly away. He watched a sailor stumble after a red-haired girl, and catch her, and kiss her clumsily.

"The basic reflexes," Martin Worth

said softly, "survive."

"Lyman—" Pat Wayland was whispering. "We must find him."

But Cartwright was shaking his head.

"We mustn't take the time," he said reluctantly. "We've got to work quickly—if we're to keep these people from dying of starvation and a thousand clumsy accidents. No, we can help Galt best by simply going ahead with the Plan."

He opened the valves, and helped carry the portable ideophore out upon the pavement.

"Just what is on the reels?" he asked Pat. He was trying to keep his mind off the strange fate of Galt. "What will the machine teach them?"

"Lyman spent years selecting the material," she told him. "There is a modified, simplified English. An understanding of all the sciences, as complete as we could make it. The principles of art, music, morality, religion, law—of everything good that the Old World knew.

"Nor is that all. For there is a danger, you see, that Utopia will be corrupted by the remains of the Old World, that lie all about. And there is another danger, that the Utopians will go off on a tangent, and forget their great task of saving the Earth from the Holocaust.

"To meet those two dangers, the ideophore will impart feeling of respect and obedience for a special Law. They will revere us, as the Four. They will know us as human beings, like themselves—but human beings of mysterious power and authority, who must be obeyed. That will enable us to keep them to their great task, and to preserve them from contamination by the things of the Old World.

"It will be forbidden to enter any of the buildings of the Old World, or to use any of the old machines, or read any of the old books—except of course that we shall have to make certain temporary exceptions, at first, to assure them food and shelter and the means to make the new beginning."

A TALL man in the splendid garb of a hotel doorman escaped the sprawling babbling mob about the wrecked lunch stand. He came stumbling up the street, carrying his prize. This proved to be a coconut. He tried it with his teeth, and then stopped and battered it against the curb.

"He will do," said Pat Wayland. "He is intelligent and strong."

Captain Drumm raised a shining little pistol. Cartwright snatched at his elbow.

"What's this?"

Drumm displayed the small weapon.

"Paralysis," he said. "It shoots a tiny steel needle, tipped with a chemical of Pat's. Effective up to forty yards. It temporarily paralyzes the motor nerves, without destroying consciousness or have any permanent effect. One shot lasts from five minutes to half an hour."

"Oh!" Cartwright looked suddenly at Pat Wayland. "Down in the vault, when you put me to sleep, was that—"

The girl nodded as Drumm fired the tiny gun. It made a sharp little *ping*, and the victim dropped over his coconut. They wheeled the portable ideophore to him, propped up his limp head, and fitted a light helmet over it.

Pat started the humming converter, adjusted dials.

"The paralysis of the motor nerves," she commented, "prevents the usual spasmodic reflexes." She moved a lever. "Thirty seconds—that's all. You may remove the helmet."

They stood watching. In a few minutes the man stood up, and deftly straightened his uniform. His face bore a friendly and intelligent smile.

"I thank you, Four," he said simply, "for selecting me to be a leader of the Utopians. I will obey your Law, and labor to build Utopia, so that the men to come may save Earth from the Holocaust. Now I must help my comrades to find food and shelter."

Leaving them, he picked up the coconut that had baffled him before, and broke it on the sidewalk, and gave the fragments to a weeping woman who had not yet learned to stand.

Ping, ping, ping, ping!

With four swift shots, Drumm's paralysis gun toppled four men in a group. Pushing the wheeled cabinet,

carrying the four helmets, the others moved toward them with the ideophore.

CHAPTER X

The Renegade

IN A THOUSAND cities and hamlets, on every inhabited continent, the same procedure was repeated. The *Pioneer* settled amid the clumsy, speechless victims of the tau-ray. Captain Drumm, with the paralysis gun, dropped half a dozen or half a hundred men and women. From the magic of the ideophore they rose again, to be the leaders of the Utopians.

Washington and Yokohama; Paris, Texas, and Paris, France; Berlin and Toledo, Ohio; Moskva and Montevideo; Honolulu and Singapore; Nome and Petropavlovsk and Kansas City—and ten thousand more.

The weeks and then the months went by. For the Earth was large. Even though they worked day and night, snatching odd bits of sleep one by one, it took a long time to cover all the planet. And they found unpleasant things.

They found hunger, and blood, and death.

In Tokio, the tau-ray must have left no memory of the art of quenching fire—not even of the danger of flame. Only black ruin was left when the *Pioneer* came. Four helpless millions perished in that unopposed conflagration of flimsy tinder-houses. Nor was Tokio the only city that burned.

In the crowded areas of Europe and Asia, the food at hand was soon exhausted. The speechless rabble, oblivious of the intricate machine of commerce that once had fed them, poured out of the cities in a ravening horde. They stripped the countryside of everything edible. Starving men became hunters of men.

Once, staring at a broad military road in Germany, that was scattered with white, tooth-marked bones, Jay Cartwright felt a cold overwhelming sickness at all the agony and death the tau-ray had brought. Leaning against one of the *Pioneer's* small round ports, he shuddered.

"To kill one man was murder," he said faintly, "and you died for it. To rob one man was a crime, and you paid for it with years of your life. We have murdered perhaps half the population of the Earth. We have robbed the rest—even of all memory of what they have lost."

His voice rose, raggedly.

"Then what are we? Thieves? Murderers? No! There is no word in the language that fits the thing that we have done."

The steady iron hand of Captain Drumm fell upon his shoulder.

"It's a terrible thing, I know," Drumm said. "But life has always been terrible. The old must give way to the new. A thousand must perish, so that one may have life. So it has always been, since the first hungry cell devoured another.

"Remember, our goal is the survival of the race. Mankind was following a road that led straight to doom. We are setting him upon a different path. It may be harder, in the beginning. Many must fall by the way. But, in the end, it must lead to life—to a life more splendid than was ever glimpsed before the Oblivion."

Cartwright was staring at the bones. "But so many," he said, "have died."

"PERHAPS they have died," Drumm said. "But the most of them were never alive. They were not ends. They were only means. They were not individuals. They were cogs in a machine—that was already breaking down."

Cartwright turned away from the port, and shook his yellow head.

"Still there's a lot that I don't see," he said. "Why must we drive men out of their cities? Why must they lie under the rain and the frost? When they need tools, why must they let good implements rust? When millions are roving on foot, why must the railroads be abandoned?"

"Because there must be a clean break with the past," Drumm told him.

"Men had too many machines. In offices and subways and factories, their lives were geared to the machines. Men made machines of themselves. They had no time to live.

"There will be machines in Utopia, of course. Ultimately, there will probably be more and mightier machines than the Old World ever dreamed of. But they will be the servants of men, and not the masters."

Again, doubtfully, Cartwright shook his head.

A YEAR had gone, since the day of Oblivion, when the *Pioneer* dropped toward a new village upon a low hill in what had been New Jersey. It had been, a year ago, only a cluster of leaf-thatched huts. But a kiln was now smoking beside it, and a new circular building, of brick and stone, was rising in its broad central square. Fields, below, were green with a late corn and turnips and beans.

As Cartwright dropped the little geoflexor toward the dusty street, he looked across toward the lonely towers of the abandoned metropolis, thirty miles eastward. Bitterly, he laughed.

"And we made men give up that—for this!"

"But," asked Captain Drumm, as they emerged, "do they seem to mind?"

Three children were shouting and laughing as they drove a herd of spotted cows out to pasture on the hillside. An anvil rang cheerfully in a smithy. Saws and hammers made a pleasant sound from the building. Song rose from a man plowing with two horses in the field below.

A little group of men came, with a manner of friendly respect, to greet the Four. Their leader—who still wore the tattered splendor of a hotel doorman's uniform—eagerly told of the progress that the town had made.

"The harvest will give us food for all, and we are hauling wood for the winter. That is our new community building. It will house a laboratory and a school. Next year, we plan to open a pottery, a mill, and a small chemical works."

"Splendid," said Captain Drumm.

"Good," said Cartwright. "And if you have need of more fuel and iron, remember that all railroad tracks lying outside of cities are exempt from the Law." His eyes surveyed the busy village again, as he asked, "Are your people happy?"

The leader smiled, and nodded.

"We are happy," he assured them. "Why should anyone be otherwise, in Utopia? We have made a place for everyone. Each has his own tasks to do, and his sure rewards. There were hard times at first, but now there is food and shelter for all. But there is one thing—"

THE voice of the leader grew troubled. He paused, and made a little unhappy gesture eastward. The towers of the old city were lost in the misty distance. But Cartwright saw a blackened patch on another little hill. And he saw three bodies swinging from a rude gibbet, nearer.

"What's that?" Cartwright demanded. "Has the Law been broken?"

"The Law has been broken," the leader told him grimly. "Those three hanging are renegades. They were captured in a fight, after their band had taken and burned the village on that hill. We hanged them, as the Law requires. But the most of the band escaped."

Cartwright stared soberly at the distant gibbet. Renegades. All over Earth there were renegades. They were men who had escaped the ideophor, and defied the leadership of those the ideophore had taught.

Savages. Some bands were yet speechless, though the most of them had learned a few words from the Utopians who had tried in vain to lead them. A few individuals among them must have had some dim memory of the Old Times, for they displayed a surprising aptitude for learning to use the forbidden machines and weapons, in the forbidden cities they haunted.

"The band dwells in the old city, where the Law forbids us to follow them," the leader was saying. "But they have a daring chief, who is called Silver Skull. He often leads them out

in raids across our peaceful lands.

"With the other nearby villages of Utopia, we keep watchmen upon the hills toward the river. When we have warning of a raid, we arm ourselves as best we can, and fight to save our homes. But Silver Skull is very cunning. He took our neighbor village in the night, by surprise."

Cartwright turned to his companions, with a troubled frown.

"I was afraid something of the sort would happen," Captain Drumm said soberly. "I knew the job was pretty big, for us. Really, we needed a thousand *Pioneers* and a thousand ideophores, to sow the seed of Utopia, before these weeds of a new barbarism had fouled the soil.

"There's danger, now, that these renegades will contaminate all Utopia, with their defiance of the Law. Certainly, we can't expect the Utopians to make much progress toward their big job of saving the Earth, with a lot of savages preying on them."

"Well." Cartwright jerked his yellow head, grimly. "We'll give the Utopians some better weapons, so they can defend themselves."

"Lyman foresaw the possibility of something like this," Pat Wayland told them. "He provided for it, in the Plan. We have a special ideophore reel, that will teach the Utopians how to make swords and guns, with a suggestion that they build electrified fences around the ruins of the old cities."

"Good," Cartwright said decisively. "We'll initiate some of our Utopians into the mysteries of weapons—hoping they never get started using them on one another."

"The Law," Pat told him, "takes care of that."

The portable ideophore was set up, beside the silver egg of the *Pioneer*, when a ragged blood-stained man came staggering up the hill. He stumbled gasping to the leader of the village, who was still somewhat dazed from fifteen seconds of ideophore instruction on the defense of Utopia.

"SILVER SKULL!" he panted. "It was Silver Skull—he came in the dark. I know it was Silver Skull. His head was white in the moonlight. He stabbed me."

"Where is he?" demanded the tall leader.

"He has gone back with his men into the forbidden city, now. He carried Red-hair away, and left my friend Slim lying dead in the burning camp."

"Where was this?" asked Cartwright. "And what happened?"

The panting man stared at him with dull bewildered eyes. He was hugging one arm, and the sleeve was sodden with blood.

"At our camp," he said, "we were burning lime with ties from the railroad. We were far from the forbidden cities, and we thought there was no danger. Last night, after the kiln was fired, we slept.

"We were fools. For it was Silver Skull who woke us. He killed Slim, and took Red-hair, who was going to be Slim's wife." He was sobbing, gripping the red arm. "Slim was my friend."

"Come." The leader beckoned to him. "We'll care for your wound. Soon our fear of Silver Skull will be ended. For the Four have taught me to make weapons, and fences that the renegades cannot cross."

"But still," whispered the wounded man, "my friend Slim is dead. And Silver Skull has taken his girl."

Jay Cartwright turned impatiently. "I think we had better do something about this fellow Silver Skull right now," he said, "without waiting for guns to be manufactured. Or he may be turning out with guns of his own, out of some police armory."

Drumm's blue eyes were shining eagerly.

"I was just about to suggest it, Jay." He turned to the tall leader. "Get your men together, and show us the trail of the Silker Skull. We'll bring him back to hang for his defiance of the Law."

The leader gave quiet orders. Soon a hundred men were gathered, a dozen of them mounted. They were armed only with their simple tools, axes, hoes, pitch-forks, saws, and sledges. The *Pioneer* floated above them, north

He stared in wonderment at that strangely altered planet (Chapter XX)

to the burned camp where the murdered lime-burner lay dead, then east toward the abandoned cities along the Hudson.

The men, Cartwright noticed, kept to the open roads and the fields, avoiding the ever more frequent buildings. At last, at the weed-grown outskirts of what had been Union City, they stopped. When the *Pioneer* was landed beside them, they refused to go any farther.

"It is the Law," their leader said. "We cannot enter the old cities."

"We'll make a special exception," Cartwright told him, "until Silver Skull is caught."

But it was not that simple. He had not realized the lasting power of the ideophore's suggestions. The Law was the Law, it had to be obeyed. Not one man was willing to break it, even at the command of the Four themselves.

The leader was respectful but firm. The Four were the mysteriously gifted ruler-scientists of Utopia. It was the Law that in most matters they should be obeyed. But the Law said absolutely that the old cities must not be entered.

Captain Drumm abruptly shrugged the gold-and-crimson splendor of his shoulders, and turned away from the frightened hundred.

"LET 'em wait," he said. "And we'll go after Silver Skull by ourselves."

"We had better not try it," Cartwright said reluctantly. "The *Pioneer* isn't armed. We've no weapons but the paralysis guns. And if they're hidden in some building, we could hardly find them from the air."

"I'll ride a horse," Drumm said, "and follow the trail. You can scout for me with the *Pioneer*. The paralysis gun will take care of Mr. Silver Skull, until the Utopians are ready to hang him."

He borrowed a harness-scarred gelding that once had carried a New York traffic officer, and which had quickly re-learned what it had forgotten—for animals too had been subject to the action of the tau-ray. With two bright little guns belted over the crimson coat, he swung briskly into the saddle, and rode into the deserted streets of the forbidden city.

The hooves rang musically on the pavement, echoing against a strange depressing silence. The buildings already looked gray and neglected. Tufts of grass had pushed through cracks in the sidewalks. Broken windows leered. A naked white skeleton, here on the pavement, there on a doorstep, told its own mute story of the Oblivion.

Cartwright guided the *Pioneer* a hundred feet above. Alertly, at the ports, Pat Wayland and Mart Worth watched for any sign of the renegades.

"The trail is leading toward the Lincoln Tunnel," Worth commented. "Probably our Big Chief Silver Skull has got his headquarters somewhere in the old subways under Manhattan. We'll never find him, there."

"But there might be an ambush." The wide blue eyes of Pat Wayland rested on Drumm's erect, red-clad figure. "You shouldn't have let him ride in here, Jay," she protested. "It's splendid of him—the sort of dashing thing he loves. But he might be killed."

"I know," Cartwright said soberly. "But I think we had better get this Silver Skull—I've got a hunch that he's the Plan's greatest enemy."

He looked suddenly away from the strained anxiety on her lovely face. Suddenly he was wistfully envious of the courage and dash of Captain Drumm. Probably none of the three would ever win Pat's favor. But, if any did, it would be Drumm. Well, Cartwright insisted to himself, Drumm deserved her. There was never a braver man.

"Oh—*there!*"

Pat cried out the warning, pointing. Cartwright saw the little swarm of ragged grimy men. With a slinking, feral quickness, they darted out of weed-tangled alleys and broken windows. They rushed upon the lone horseman.

"Jay—" Pat was trembling, voiceless. "Can't you *do* something?"

But already Cartwright was dropping the *Pioneer* into the street, to warn Drumm and possibly to disconcert his attackers. But the screaming renegades, leaping to surround the horseman, paid the ship no heed.

They were a fantastic lot, gaudy with silks and jewels from looted shops. Their weapons, Cartwright thought, must have come from some museum. For they carried swords and pikes and spears and medieval battle-axes.

"Look!" gasped Pat Wayland. "Silver Skull!"

HER quivering hand pointed to a dark gigantic man, who clutched the wrist of a frightened red-haired girl. All in green silk and fur, he was as splendid as Captain Drumm. On his head, hammered into a crude helmet, he wore an aluminum kettle—whence, Cartwright thought, his name. His weapon was a long iron-tipped African assagai.

Mouthing weird, incomprehensible cries, the renegades converged upon Captain Drumm. The frightened horse reared and snorted. But Drumm held his seat, without apparent effort, and a bright paralysis gun moved swiftly in his hand.

Ping, ping, ping!

The foremost renegades began to stiffen and drop.

Dragging the girl, Silver Skull rushed forward. Thrust with all his weight, the assagai ripped into the belly of the rearing horse. It fell screaming backward, and Drumm went out of sight.

"Oh!" whispered Pat. "He's—*under*—"

Her white hand caught at her throat.

Desperately, Cartwright flung open the valves. He was cold, trembling—he wished that he had Drumm's easy courage. But with Drumm pinned under the horse, it was up to him. He snatched a little paralysis gun out of its rack, and leaped out of the *Pioneer*.

But he tripped over one of the fallen renegades. Stumbling back to his feet, he saw the fantastic figure of Silver Skull toppling beside him. And Cautain Drumm rose, grinning and unharmed, behind the bulwark of the horse.

"Well, Jay," he said cheerfully, "we've got Silver Skull!"

He turned to steady the paralysis gun on a bent elbow and drop the last of the renegades fleeing down the alley. The red-haired girl was on her knees, weeping, beside the fallen chieftain. Cartwright walked to her side, looked down at the tanned features beneath the batted aluminum helmet.

A cold hand clutched his heart.

"What's the matter, Jay?" Captain Drumm came anxiously toward him. "You look as if you had seen a ghost."

"I have." He pointed at the man on the ground. "Silver Skull is Lyman Galt!"

CHAPTER XI

The First Generation

MARTIN WORTH helped Pat Wayland down from the ship. They came to where the red-haired Utopian girl was weeping over the stiff form of the paralyzed chief. Pat started back from her first glimpse of him, and her face went white. All the V's of little Worth's face were sharpened by his sardonic smile.

"We came to get Silver Skull," he said softly, "so that the Utopians can hang him." He laughed faintly. "Now we've got him."

Pat Wayland was clutching at her white throat.

"But—it's *Lyman!*" Her voice was husky. "We couldn't take Lyman back to be hanged."

Little Martin Worth was staring at the fallen man, and all the sardonic mockery was gone from his face.

"If I ever had a friend," he whispered, "it was Lyman."

Stern little furrows etched the bronzed face of Captain Drumm as he snapped a fresh clip of tiny cartridges into the paralysis gun.

"He was my friend, too," he said softly. "But—does that make any difference?"

Slowly, Cartwright shook his yellow head.

"It makes no difference," he said. "Because Silver Skull isn't Lyman Galt. Lyman Galt was a sum of memories, experiences. And all those were blotted out, by the tau-ray. Silver Skull is a new individual, in the same body. He is a renegade. He has broken Galt's own Law. That Law says he must be hanged."

Drumm's red head nodded slightly. "That's true," he said.

But Pat Wayland made a sharp little cry of protest.

"But we *can't*—"

"We must," said Martin Worth. Lyman gave his life to the Plan, and it meant more than life to him. Now I think that Silver Skull is the greatest single danger to the Plan. I don't think that there is any doubt about what Lyman himself would want us to do."

Cartwright was staring at the man on the ground. The tangled black beard and the aluminum kettle and the gaudy silks seemed to melt away, and he saw all the fatigue and the pain and the desperate hope that the tau-ray had swept from the face of Lyman Galt.

"Mart's right," he said. "Galt's real life was the Utopia that he planned—the hope that that Utopia will be able to escape the Holocaust. This renegade is a threat to Utopia, to the very survival of men through the nebula. I don't think we have any choice."

His yellow head made a sharp little jerk. He looked away from the stiff fantastic figure on the ground, down to the weed-tangled street.

"We—we'll vote."

Ignoring the catch in his voice, he fumbled in his pocket for a handful of beans. He held them out in his left hand, and cupped his right. They had used this method of decision before.

"A black one is a vote for the death of Silver Skull," he said huskily. "Three votes carry."

He looked aside as one by one the others came forward, selected a bean from his left hand and dropped it into his right. Over his own vote, he paused half a minute. Despite himself, he looked back at Silver Skull. And the barbaric trappings seemed to fade again, so that he saw only the tired gravely gentle man he had known.

After all, there could be one white bean.

THEY all gathered around him, and he opened his hand. Pat Wayland made a little breathless cry. Drum caught his breath. Worth smiled sardonicaly. For there were four white beans.

"Four!" whispered Pat. "Then he lives!"

But Cartwright and Drumm and Worth were looking soberly at one another. Cartwright shook his head.

"I thought—" he muttered jerkily —"I guess we all thought—I think we'll have to vote again."

Pat Wayland's tense fingers gripped his arm.

"You mean you are going to take him back to be hanged—after we have all voted to set him free?"

He nodded. Worth did. And Drumm.

"Don't you see, Pat?" he said huskily. "If we leave him, the risk to the Plan is too great."

The girl's blue eyes searched their tense faces. Suddenly she lifted her platinum head.

"We don't have to hang him," she cried. "There's a better way. We can use the ideophore on him."

Cartwright shook his head, doubtfully.

"I don't know," he said. "If we had found him right after the Oblivion, the ideophore would have made him a leader of Utopia. But now his hardships and his struggle to survive have given him an independent aggressive personality. I'm afraid the ideophore wouldn't change that. I can still teach him facts. But I don't think it will make a good Utopian out of him. You know, we have found a rising curve of failures, ever since the first few weeks. Now, if we could use the tauray on him again—"

"The tau-ray works just once," Pat Wayland said. "An immunity is developed to the virus." Her face was

pale and taut. "But let's try the ideophore." Her blue eyes went appealingly from face to face. "I believe it will work. Let's vote again."

"If you think it will work—"

They balloted again, and again there were four white beans.

"It is the ideophore," said Cartwright, slowly. "And I hope it makes a different man of Silver Skull. I hope it gives us back . . . Lyman Galt."

The Utopian girl watched them, tearfully, as they brought the portable ideophore and fitted one of its helmets to the renegade's head, in place of the aluminum kettle. When the thing was done, Cartwright offered to take her back to the town.

Kneeling over the prostrate man, she shook her head.

"I shall stay with Silver Skull," she told him. "He made me break the Law. He made me touch the forbidden things, and enter the forbidden places. Now I am an outcast, and I shall stay with him."

She clung to his brown hand.

"He is not like any man I knew in the town. He speaks little. He knows nothing of science and Utopia and the Law of the Four and the Holocaust to come. But he has a strength, a fire. I shall stay with him."

Pat Wayland moved suddenly forward, and touched the girl's red head. She slipped a thin jeweled watch from her arm, and put it on the girl's slender wrist. Tears gleamed in her eyes.

"Take this," she whispered. "He gave it to me, many years ago. But he doesn't remember."

"Thank you," she whispered. "The Four are very good."

"WHEN Silver Skull wakes," Cartwright warned her, "tell him to cease molesting the Utopians. Tell him that we are giving them new weapons that can destroy him. Tell him to heed the Law that we have taught him as he slept. Tell him that if we must come again, we shall kill him."

The girl's tearful face burst into a smile.

"Then you haven't harmed him. You are going to let him live?" Cartwright nodded. "Then the Four are very kind."

"Perhaps," murmured Cartwright, "too kind."

They carried the ideophore back aboard the geoflexor. Looking back from the drumming *Pioneer*, as it lifted with them, they saw Silver Skull stir and rise. He made the girl fit the aluminum helmet back upon his head. Then, pushing her behind him, he caught up the bloody assagai and

[*Turn Page*]

MR. WRIGHT FOUND OUT HE WAS WRONG!
MR. WRIGHT: Gee, this stuff is awful! Why do all laxatives taste so bad?
MRS. WRIGHT: All of them don't. Ex-Lax tastes like delicious chocolate.
MR. W.: Ex-Lax? That's O.K. for you and Junior, but I need something stronger!
MRS. W.: No, you don't! Ex-Lax is just as effective as any bad-tasting cathartic.
LATER
MR. W.: I sure am glad I took your advice. It's Ex-Lax for me from now on.
MRS. W.: Yes, with Ex-Lax in the house we don't need any other laxative!
The action of Ex-Lax is thorough, yet *gentle!* No shock. No strain. No weakening after-effects. Just an easy, comfortable bowel movement that brings blessed relief. Try Ex-Lax the next time you need a laxative. It's good for *every* member of the family.
10¢ and 25¢
EX-LAX

shook it angrily at the departing ship.

"Still," Pat Wayland insisted, "I believe the ideophore will change him."

"We'll come back before we leave the Earth," Cartwright said, "and see."

For another year, they toured the communities of Utopia. It was impossible, Pat Wayland at last agreed, for the ideophore to make any more renegades into good Utopians. All the towns that had suffered from the unregenerate bands were supplied with instructions for defense.

Many thousands received ideophore training in science and technology and the various arts. And hundreds of the most promising scientists received a special reel devoted to astronomy and all that was known of the advancing nebula.

"The whole object of the Plan," Cartwright said, "is to enable men to advance far enough to save the Earth from the Holocaust. We must never let the Utopians forget their great task."

The *Pioneer* came back at last to that town in New Jersey. Cartwright was amazed at the progress of a single year. Straw-thatched huts had given way to neat tiled cottages and pleasant community buildings. A hundred new industries were busy, and the happy-seeming people had replaced their tattered Old World garments with gay synthetic fabrics.

Geoflexor fliers, similar in design to the *Pioneer*, although their copper cathode power tubes were not powerful enough for interplanetary flight, already carried commerce between the Utopian towns.

A world-wide Congress of Men had been organized, to coordinate all effort toward the great problem of the coming Holocaust. Plans were already drawn for a super-observatory, to be erected upon a western mountain.

Anxiously, Cartwright inquired about the renegades.

"There were a few more raids," the leader of the town told him. "But we turned back the last of them with the new machine guns. And now we have finished a charged wire barrier and a wall of towers, surrounding the forbidden city. I think there will be no more trouble."

"Silver Skull?" asked Cartwright. "Their leader—do you know anything of him?"

The Utopian shook his head.

"Silver Skull has not been seen since the Four pursued him into the city. We believe that he was afraid to defy the Law again. Anyhow, with our new defenses, Utopia is safe."

THE *Pioneer* flew westward, to the new metropolis of Star City. The new observatory was to be erected above it. And the Congress of Man was already in session there. The representatives of Utopia greeted the Four with a warm respect.

Forgetting his old diffidence in the urgency of what he had to say, Cartwright spoke before the Congress. He reminded them of the approaching nebula, and the great task of saving Earth and mankind.

"I don't know how it can be done," he said. "For it is a bigger thing than men have ever tried to do. The science of the Four enables us to do many things. But it suggests no answer to this great problem.

"We Four, will aid you in every way we can. We shall return from our own place at intervals of thirty years, to see what progress you have made. But we can do little more than observe your efforts, and suggest lines of effort, and keep the new generations reminded of the task.

"For the problem is one that no small group will be able to solve, nor any single generation. Two hundred and twenty-eight years are left, before the Holocaust. Every day of it will probably be needed.

"Now the job is up to you. We'll come back, in Nineteen Seventy-two, I should say, the year thirty-two of the Oblivion—to see what you have done."

Applause thundered in the hall. Pat Wayland and Mart Worth and Captain Drumm were called to the platform. The Utopians made confident promises of progress. And then the Four went back aboard the *Pioneer*.

Star City dropped behind. The con-

vexity of western America contracted into the Earth's misty globe. The rugged Moon grew large against the stars ahead, and the little ship dropped toward the white fortress on the peak of Arzachel.

A photo-cell opened a massive valve in its wall, and Cartwright maneuvered the *Pioneer* into a compartment buried behind many yards of rock and armor.

"To protect the ship against meteorites," Captain Drumm explained to Pat. "Here, with no atmospheric barrier, we have to expect a good many of them. In two hundred years, or even thirty, there's a fair chance that one would smash the *Pioneer*."

"What about us?" queried the girl. "Inside?"

"That depends." It was Worth who answered, grinning sardonically. "A few tons of steel, going thirty or forty miles a second, could give the fortress quite a jolt. If you care for an estimate of the statistical probability—"

"Never mind," Pat said hastily.

The elevator dropped them nine thousand feet, into the narrow gray-walled corridor before the vaults of sleep. The girl hurried from cell to cell, setting the elaborate clockwork mechanism within the armored doors. At last she came back to the others, nervous and pale.

"They are set for thirty years," she whispered. "For 1972."

For a strained little moment they all crowded close together. Cartwright didn't want to leave the others. There was something terrible about the very thought of going to sleep for thirty years.

SO many things could happen. Suppose a great meteor did strike? Even if it didn't kill them as they slept, it might cave in the elevator shaft, and leave them buried alive. Suppose the clockwork failed? If some tiny part went wrong, they might never wake again. Even if the clockwork operated perfectly, there still was danger. The effects of the sleep gas had never been tested over a period so long.

Anything might happen.

"Night, darling."

Captain Drumm spoke cheerfully to Pat, and strode into the vault that bore his name. The girl gave him a white, uncertain smile. Worth turned silently away. With a little awkward gesture, Cartwright walked into his own narrow cell.

He closed the massive door, and sat down on the bunk. The gray walls seemed very close about him. He could almost feel the weight of the thousands of feet of rock above. Suddenly he was breathless, cold with sweat.

He pulled off his clothing, drew on the light robe, and reached at last for the stud on the wall that would start the mechanism. But his hand fell away. He sat, as it were, shuddering on the brink of an abyss of three decades.

Beyond the faint racing tick of the clockwork, there was no other sound. The silence was overwhelming, the burden of a world where motion had ceased. Thirty years meant nothing, here. No more than thirty seconds, or thirty millennia. For the Moon was dead.

Thirty years, he wondered restlessly—what would they mean to the Earth? Would the Utopians carry on, from the beginning they had made? What marvels of science might three decades disclose?

A dread obsessed him. Suppose something turned the Utopians away from their great task? Recklessness of futurity, or despair. Then thirty years would be just one tremendous leap toward the Holocaust, toward the final end.

He wished, suddenly, that he knew what the ideophore had done to Lyman Galt.

The silence clotted about him. He moved, clapped his hands together, made a dry-lipped effort to whistle. But the stillness grew. It came in little waves, that drowned the ticking of the clock. For it was death. It was the enemy of motion and life—

"Aw, nuts!"

Cartwright jerked the words out. With a sudden effort he touched the stud on the wall. The light went out. He heard a hissing. The fragrant

pungence of the sleep gas was strong in his nostrils. He had just time to settle into a comfortable position on the bunk.

He slept.

On Earth, a generation passed.

CHAPTER XII

The Gray Chieftain

A DRAUGHT of cold air waked Jay Cartwright. His body felt oddly numb and stiff, but he sat up on the edge of the bunk. He blinked his sticky eyes, and stared bewilderedly about the small gray cell, and at last saw the clock on the door.

It was August 18, 1972. The thirty years were ended.

He stood up, painfully. Opened a sealed water-jar. Rinsed his dry, bitter-tasting mouth. Splashed water over his stiff dry skin. Gulped thirstily.

Movement restored elasticity. Putting on his clothing, he became conscious of a ravening hunger. He felt weak with famine as he pushed to open the massive door.

He was the first in the narrow gray hall. He waited, wondering what thirty years had done to Utopia. And what it had done to them. Would they be changed, aged?

There was no mirror in the hall. But Cartwright thought that he had an old man's stiffness. He looked at his hands—they seemed thinner, yellowed. He fingered the beard on his face.

At last little Worth came out. His black beard grew down to a point, making him appear more satanic than ever. But, to Cartwright's relief, he was not visibly older.

"Sleep well?" Worth grinned sardonically. "Half a dozen more such naps, and the Earth will be plunging into the nebula—unless our Uptopian friends have found something to do about it."

He burst suddenly into laughter, at sight of the thick red expanse of Captain Drumm's beard. Pat Wayland, her blond beauty unchanged, came out of her own vault, and stared at the men.

"Evidently," she observed, "the hair-roots remain disproportionately active. I hope your razors haven't rusted."

The elevator whisked them to the living compartments above. It was the lunar mid-morning. The harsh desert floor of Arzachel remained as ever changeless. Northward, above the dark peaks of the barrier ring, hung the Earth.

"Thirty years!" Pat was whispering, faintly, as they all stared at the mother planet. It was huge and bright against the starry void, mottled with cloud, msyterious. "I can't wait to see what has happened.

"Perhaps the seed we planted will already have grown beyond our knowledge. P e r h a p s the Utopians have already found a way of escape."

"More likely," Worth said, "they have forgotten about the nebula, and gone to building empires."

"If they have," Cartwright said, "we'll remind them again."

The shaft of Earthshine, through the port, struck Pat Wayland's face. It softened her smooth features, and her blond hair shone. Her eyes were dark and grave.

"I wonder," she whispered, "what has happened to Lyman."

"We all do, I guess," Cartwright said. "Perhaps we'll find out, on Earth. But, first we eat."

"And shave," said Captain Drumm.

Five hours later, the *Pioneer* dropped toward Star City, on the Pacific coast. Three decades had made it a splendid metropolis, the graceful pylons of its buildings wide-scattered across verdant parklands.

The parks were crowded today, for the Utopians had planned a festival to honor the return of the Four. An escort of gay-painted geoflexor ships guided the *Pioneer* to the entrance of the splendid new white glass hall of the Congress of Man, where the committee of welcome was waiting.

AN aging, white-haired man came smiling to take their hands.

"Welcome, Four," his cracked voice said. "Perhaps you don't remember me. I am the first man you taught, after the Oblivion. I am the leader of Eden Tower, in the east. Remember?"

Cartwright remembered the tall man who had worn a hotel doorman's uniform. He nodded, listening.

"We have made a great festival in your honor. For we remember that you came to our aid, after the Oblivion, and taught us how to build Utopia. We have planned displays, to show you the greatness and the splendor that we owe to you."

Martin Worth's eyebrows flickered sardonically.

"What about the Holocaust?" Cartwright demanded. "What progress have you made toward saving Earth from collision with the nebula?"

"There is our observatory."

The aged Utopian beckoned at the dark arid mountains beyond the city. Like a white jewel, shining on a peak, they glimpsed the dome of it.

"The scientists are working there," he said. "And now the Congress of Man is waiting to receive you. There will be speeches by the greatest of the leaders, and our foremost scientists."

"Just what, definitely," Cartwright asked, "have they accomplished?"

"They are following a hundred lines of research," said the Utopian. "None of them is yet complete—but we have two hundred years, before the Holocaust."

"Which," Cartwright said, "is a pretty short time, against the job you have to do."

"Wait," the Utopian urged him, "until you see all that we have done—our splendid cities, our new machines, our painting and sculpture, our athletes—all of Utopia.

"Ours is a cooperative world. We have made a place for every individual. There is no hunger or want or idleness. Competition is eliminated. There is no strife or disorder, because all of us hold the same ideals. Every need of every individual is provided for. We are each a part of the one great Plan. Now, the speakers are waiting. Will you receive welcome?"

"Wait," Cartwright said. "One more question. What about the renegades?"

"They trouble us no more." The old Utopian shook his head. "They have been almost exterminated. We still keep guards posted in the towers of the barrier, but they seldom even glimpse any of the few renegades that remain."

"Silver Skull—did you ever learn any more of him?"

"Nothing," said the Utopian. "He was never seen, after you pursued him back into the forbidden places. The Congress is waiting."

At last the speeches were done, the tour of cities and factories and laboratories ended. Cartwright made his final promise that the Four would return again in the year 62 of the Oblivion, and every thirty years until the Holocaust. For a last time he urged the tremendous importance of finding a way to escape the nebula. And the *Pioneer* rose again from Star City.

Looking back at the far-spread splendor of the Utopian metropolis, Cartwright doubtfully shook his yellow head.

"I'M not quite happy about it all," he said. "It seems to me there is too much ceremony and too many games and too much respect for the Law—and not enough real hard work on the problem."

"After all," said Captain Drumm, "they still have two hundred years."

"That's just the trouble," Cartwright said. "Men never have worried very much about what was going to happen to their great-great-grandchildren. Not even the ideophore can make them do that."

"Anyhow," Drumm said, "the danger will become more real to them as time goes on. With the fine beginning they have already made, they can't help going ahead."

"We'll see," said Cartwright, "in the year two thousand and two.

Pat Wayland had been staring silently back at the Earth. Her platinum head turned abruptly, and her blue eyes were grave.

"In Two Thousand Two," she whispered. "I was thinking of Lyman. By then, he'll be dead. If he isn't already. I was just wondering what the ideophore did to him. If—"

Her troubled eyes looked at Cartwright, and Drumm, and Worth.

"Can we land in New York?" she asked. "We might find what became of Silver Skull."

"I'd like to know," Cartwright said.

"There's danger," Worth reminded them. "The renegades weren't too friendly to begin with, and thirty years of imprisonment in the barrier fences can't have made them any kinder."

"We beat them once," declared Captain Drumm. "We can do it again."

They turned the *Pioneer* toward what had been New York. The sun sank behind them as they approached the ruins. Thirty years, they saw, had made a change. Beyond the white towers that studded the barrier, and the green well-ordered countrysides of Utopia, the old metropolis made a dark, rust-stained blot.

Cartwright brought the ship down in Times Square, to the very spot from which he had watched the Oblivion come. Time-stained buildings towered lonely about them, hail-shattered windows staring blankly.

Weeds had conquered the pavements. Abandoned taxis made little mounds of debris beside the curbs. A few white human bones, here and there, still spoke their mute tales of the Oblivion.

"I wonder—" Cartwright shook his head. "It's queer there's no sign at all of the renegades."

He moved the *Pioneer* up and down Broadway, dropping to the pavement at a dozen different spots. But there were only weeds and rust and tumbling buildings and those time-bleached bones.

"It's no use," said Martin Worth. "The Utopian guards have probably exterminated them."

Cartwright nodded.

"I think we may as well give it up."

He had lifted the *Pioneer* again, when Pat Wayland caught at his arm.

"Look—there's someone in Central Park. A girl, I think. It looks as if she's picking flowers."

CARTWRIGHT brought the little ship down again. The girl stood watching, as it landed near her. She wore a simple brief little dress of flowered print—that, Cartwright knew, must have been manufactured before the Oblivion. She was tall and dark-haired, and her arms and legs were tanned. Holding the bunch of wild flowers against her breast, she watched them, unafraid.

"Pretty," murmured Captain Drumm.

"Let's go out and talk to her," Pat's blue eyes were shining eagerly. "Probably she can tell us what became of Silver Skull."

"Better go armed." Worth thrust paralysis guns at Cartwright and Drumm. "She might not be the simple angel that she looks."

Cartwright opened the valve, and led the way down to the thick-matted grass. The girl began to retreat from them, toward the old subway entrance at Columbus Circle.

"Hello," Pat Wayland called to her. "We won't hurt you."

"Go away," the watchful girl shouted back. "I don't like Outsiders."

"We just want to talk to you," returned Pat. "Where are your people?"

"I have no people," said the girl. "My people are all dead."

"Did you know Silver Skull?" Pat Wayland's face was white. "We were friends of Silver Skull."

"Come, if you were friends of Silver Skull," the girl called back. "I show you the grave where he is buried."

She let them approach within a few yards of her, and then led the way again toward the old subway. Tall and strong and tanned, moving with an alert quick grace, she was almost beautiful. But some hint of restrained hostility made Cartwright apprehensive. He gripped the little paralysis gun.

"You need have no fear," she called softly, "for I am all alone. This is the grave of my father."

She bent over a tangled clump of weeds—and then suddenly rose and swung to face them, with a well-oiled sub-machine gun cradled in her brown arms. Her clear voice pealed out, triumphantly;

"Father! Sam! Harry!"

A little band of silent, grim-faced men rose magically out of the weeds. They were bristling with knives and guns, and came forward with a wary alertness.

Captain Drumm's hand moved, with the paralysis gun. And the tanned girl swung her heavy weapon to cover him. Her brown face held a mocking smile.

"Don't move," she warned. "So you thought my father was dead?"

With a soft little cry, Pat Wayland stared.

Cartwright saw the tall, gray-bearded man striding from the old subway entrance. Despite the wrinkles above the beard, and the stoop of years upon the great shoulders, Cartwright knew him.

It was Silver Skull, who had been Lyman Galt.

CHAPTER XIII

The Meteor

GALT! Staring at the gnarled, stooped old man, Cartwright felt a prickle along his spine. It was uncanny. For it seemed only a few days ago, instead of thirty years, that Lyman Galt had been a young and vigorous man, burning with enthusiasm for his great Plan.

Using his iron-tipped spear for a cane, old Silver Skull came up to them. He beckoned, and two lean men with leveled rifles stepped alertly up beside the tanned girl. Cartwright wondered at something familiar in their dark-haired strength, and then knew that they were the sons of Silver Skull.

Little Mart Worth grinned sardonically at Pat.

"So the ideophore changed him?" he whispered. "It taught him how to set neat little traps."

The man who had been Lyman Galt spoke in a thin, cracked voice that was still queerly familiar:

"You Outsiders come into Manhat. You kill us when we go out. You fence us in. You shoot us from your towers. Now you come into Manhat. We kill you." His seamed face grinned at them, amiably. "Is that not right?"

He beckoned to the girl, and she moved to his side with the machine gun. The paralysis gun flashed in the hand of Captain Drumm. But one of the rifles cracked, and the little weapon went spinning away. Drumm nursed his fingers.

"Don't do that," Silver Skull grinned wider. "I think we better kill you now."

Pat Wayland ran suddenly toward him.

"*Lyman*—wait!" Her voice was urgent, pleading. "Don't you remember us—your Plan—me?"

Silver Skull stopped her with the point of his spear.

"You pretty, eh?" His hollow eyes surveyed her pale, trembling form. "My sons, Sam, Harry, take you if they want. But I don't think they want." He spat. "Outsider women no good. Too soft. You beat them, they die."

Pat pressed forward until the spear came against her body. She held out her slim arms imploringly.

"Please—Lyman—remember!" Her husky voice was frantic. "Remember that you are Lyman Galt. Remember the nebula! Remember your great Plan, to save mankind from the Holocaust!"

Silver Skull grunted, and shook his gray head.

"I am no Lymangal. I am Silver Skull. I am chief of Manhat. I never saw you. I think you only try to trick me. I think we better kill you."

He thrust a little with the spear, and the girl went white. She gripped the shaft, and her blue eyes clung desperately to the bearded man.

"Lyman—try to remember. Can't you remember—long ago—that you loved me?"

Old Silver Skull stepped back a lit-

tle, and lowered the spear. His gnarled fingerswiped a crimson drop from the point. His hollow eyes stared at the girl. He tugged bewilderedly at his beard.

"I remember a dream," he mumbled. "He came riding on a horse"—he jerked his head at Captain Drumm—"and killed me with a little death. And I saw a dream."

His blurred eyes stared past them, and he scratched at his unkempt head.

"The dream showed me many things. I saw a cloud of fire. It's name is Holocaust. It is coming to burn the world. The Outsiders must try to find a way to escape. If they can."

HE peered again at Pat and the others.

"You were in the dream. You were called the Four." His gray head shook, bewilderedly. "You were young in the dream. That was before Sam and Harry came. You still are young. I don't know."

"Oh, Lyman," sobbed Pat, "I *knew* you would remember!"

Silver Skull spat.

"I don't remember. It was a dream. But go." He shook the spear, angrily. "Get out. Go away. Don't come back. I think I let you go, this time. But I kill you if you come back again. For I am Silver Skull, chief of Manhat."

Cartwright caught Pat's arm, and they all started back toward the *Pioneer*.

"Well, Mart," the girl said, shakily, "I think the ideophore saved our lives, after all!"

With geodes booming, the *Pioneer* carried them back to the fortress of the Moon. They dropped in the elevator to the vaults of sleep. Pat Wayland set the clocks to wake them again in the year Two Thousand and Two. The aromatic gas hissed into the sealed chambers, and they slept.

The Moon turned on its axis, spinning the months away. It swung with the Earth about the Sun, counting off the years. In the tiny swarm of the solar system's worlds, it hurtled northward, decade after decade.

Above the rugged peaks of Arzachel, the Earth hung ever in the northward sky. It spun through its phases, from flaming crescent to misty disk, and disk to crescent again. The lazy blinding Sun crept for two long weeks across the stars, and set for two weeks more of night.

Out of the cosmic infinitude came an atom of metal. A mere few tons of nickel iron. Unglimpsed by the busy astronomers of Utopia, it flashed above the rim of Arzachel, and struck the central peak.

The Moon continued to measure off the months, and the Utopian astronomers saw no change in its rugged face. The Earth swung through the years, to Two Thousand and Two A. D.

That was the year 62 of the Oblivion, and all Utopia joined in a great festival to honor the second return of the Four. Scientists prepared to exhibit their discoveries, and the Congress of Man was called into session, to welcome the Four.

But the appointed day passed, the month, and the year, and the Four did not return.

"Perhaps," suggested the speaker of the Congress, "the Four have paid Utopia a secret visit, without our knowledge. Or perhaps they were content to observe our work, from their own mysterious place. But surely they will return when another thirty years have gone. For they promised to visit every generation, so the task would not be forgotten."

A new festival, therefore, was arranged in the year 92 of the Oblivion. But still the Four did not return. There was another festival in the year 122, and in 152, in 182, in 212. The Four did not appear.

"Now they will never come," declared the director of the last festival. "For the predicted Holocaust will be upon us before another generation."

And still the Moon and its mother planet moved through the well-ordered complexity of their motions, and the Sun drew its busy family northward. And, out of the galactic infinitude, a pinch of nebular dust moved toward an age-appointed rendezvous.

A rendezvous with the death of all life.

CHAPTER XIV

The World Beneath

CHIEF SILVER SKULL was a rude barbarian. The ideophore increased his knowledge and sharpened his wits, but otherwise it did not change him greatly. The second generation, however, made new advances.

The captured women had known how to write and read the simplified English of Utopia. The ideophore had taught the same art to Silver Skull. The language of the old books in the libraries of New York looked like a different tongue. But one of the sons of Silver Skull learned how to read them, and opened all the knowledge of the Old World to the renegades.

The raids into Utopia were interrupted for a few years by the building of the guarded barrier. But the prisoners in the old metropolis presently found a way to resume them, more cautiously.

From the very first days, the subways had proved useful. Because of the Law, the Utopians had never dared to enter them. They offered a way of passing unseen from one part to another of the ruins, and a sure hiding place from the scouting ships and the guards upon the towers.

It was natural to think of digging a tunnel out under the barrier. When it was done, a new degree of caution was essential to prevent discovery of the entrance. But, through the ideophore, Silver Skull knew enough of the Utopians to warn his sons of all the probable dangers, and their nocturnal forays were successful.

The lives of the renegades and their children were not easy. They lived dangerously in the shadow of Utopia. They got their food by hunting at night in the forests that swiftly reconquered the ruins, by furtively cultivating bits of ground, by fishing in the waters they could reach. They lived without certainty. But each difficulty that they conquered seemed always to prepare them to overcome another.

When the first tunnel was completed, they continued to dig others in search of mineral wealth. At first they dug laboriously, with hand tools. But the spies who went out into Utopia soon brought back the secret of the copper-cathode power tube.

The debris from the new excavations threatened for a time to clog the old subways. But a grandson of Silver Skull devised a compression-lock, through which it could be ejected upon the ocean floor.

Submarines powered by the copper-cathode tubes had no need to betray their existence by rising to the surface. Undersea fleets found the needed raw materials that could not be obtained upon the land.

The Under-men, as they came to call themselves, built up a secret power. The network of their tunnels crossed every continent, and the domed ports of their submarine fleets studded every continental shelf.

In the year 212 of the Oblivion, as the Under-men had learned from the Utopians to count time, Chief Soro Grekko brought his young son, Kran, back to the ruins of New York. Soro Grekko, now the ruler of the Under-men, was the great-great-grandson of Silver Skull. Powerful, dark-haired, he bore a strong resemblance to his ancestor. This likeness was even more striking in the case of his dark-eyed son, who was now fifteen.

MAKING two hundred miles an hour through evacuated tubes, the private rail car of the Chief brought them to a city a mile beneath and fifty miles to seaward of the old metropolis. They took a branch line toward the westward petroleum drillings, and climbed on foot through one of the first tunnels, and at last emerged into one of the ancient subways, and mounted a crumbling stair into the sunlight.

For a moment Kran Grekko was dazzled. And then, staring at the unfamiliar wonders of grass, and green trees, and a silent dappled deer watch-

ing them from a little glade, and the blue incredible splendor of the sky above, he voiced a breathless cry of joy.

"Father—it—it's wonderful!"

The dark face of the Chief grew stern as he nodded.

"It is beautiful," he said soberly. "Vast as are the tunnels and passages our people have made, the world above is a thousand times more spacious, and its sky is more splendid than all our limestone caverns. But come—you shall see."

He led the way southward, in the shadow of a thick and ancient forest. The boy followed him, pausing again and again to exclaim at the wonder of a wild flower or a squirrel or a song-bird.

"Once," said the grim-faced Chief, "our fathers lived here. This, so the ancient records tell us, was their greatest city. Ten times more people lived here than in all the spaces of the Under-men."

He paused, pointed.

"You see that long, low hill, with great trees growing upon it—that was once a row of the buildings of our fathers. Time, and fires, and tremors of the Earth, have leveled them.

"But once our people dwelt here—free to the air and the Sun and the stars."

"See, Father!" The boy pointed, breathless. "That stone is squared!" He ran to touch it, hurried on. "Why was it, Father, that our people were driven under the ground? Really, I mean. All the history books said about it seemed so strange, so hard to understand."

The Chief shook his dark head, bitterly.

"It has always been hard for us to understand," he said. "I'm to tell you what we know. Just wait a few minutes, until you have seen Utopia—that is what the Outsiders call their world."

The boy stopped again, to point wonderingly at a tall monument of brown, strangely graven stone, that towered alone above the trees.

"Look, Father. There is one building of the old city that stands."

"But it isn't of the old city," the Chief told him. "It is far older. For the ancient books tell us that it was first set up when civilization was young, in a forgotten land above our cavern city of Ohor. It is odd that the oldest thing should remain.

Beyond the obelisk they plunged again into the forest. At last, when they came into another little glade, the boy pointed with an exclamation of wonder into the sky.

"FATHER — what is that?" Above the treetops was a round, shining tower. It looks as far off as the sky!"

"That was the greatest house of the Old World," said the Chief. "Even the Utopians have built few buildings as large. In the ancient books, it is called the Empire State."

"We are going to it?" asked the boy.

His father nodded, soberly.

"More than a hundred years age, he said, "our fathers patched the roofs and repaired the elevators and equipped them with power tubes. We have preserved the building, for a watch tower. From the top of it, you can see far into Utopia."

The boy caught his breath, when at last he looked from the tower. Manhattan Island was a thick green forest, unbroken save by the tiny brown spire of the obelisk. Wild green covered the end of Long Island, and a tip of the northward mainland, and a wide border beyond the empty river.

"This was the prison of our fathers." The Chief gestured at the green. "Beyond, you can see the white towers of the barrier. And beyond them, far off in the distance, you can see the buildings of Utopia."

Shading his eyes against the Sun's unaccustomed glare, Kran Grekko saw the gleam of bright, wide-spaced pylons upon a distant hill. He saw bright, tiny flecks of ships curving above them.

"That is Utopia." The voice of Chief Soro Grekko was low and grim. "The Utopians rule all the world above—the world that we should justly share—that was denied us, after the Oblivion."

The boy was following the tiny gay ships, in the crystal distance.

"What was the Oblivion, really, Father? You promised to tell me."

"We have never understood," the Chief told him. "There is no record of it, in all the old books—for the Oblivion stopped the writing of books. We know only what our spies have learned from the Utopians—and their ideas seem twisted and strange and filled with curious gaps.

"To them, in fact, it is almost a religion. They believe that something about the Old World was mysteriously evil. And—somehow in consequence of that evil—the Earth was destined to be destroyed by a strange Holocaust of fire.

"But there were four scientist-prophets in the Old World—so the Utopians believe, though the old books say nothing of them—who foresaw this Holocaust. And, to save the Earth from it, they caused the Oblivion.

"What that really was, we have never learned. But it caused men everywhere to forget the Old World. Only the Four remembered. They taught the Utopians, and led them out of the old cities, and gave them a new Law.

"The Law of the Four forbade any men to know the old knowledge, or enter the old places. The penalty was death. Our fathers were those who broke that Law. The Utopians could not come into the old places, to kill them. But they build the barriers to keep us here, and destroy many from their towers.

"The Utopians regard the Four almost as gods—though evidently they never claimed to be anything but human scientists. They were three men, and a beautiful woman. There was a legend that they were immortal, and would return at intervals to assure the Utopians of safety from that Holocaust they had threatened.

"NEARLY two hundred years have passed since they last were seen. But still the Utopians expect them, and prepare an elaborate festival in their honor, every thirty years. The Utopians are strange people."

"They are very fortunate." The boy filled his lungs with cool fresh air that was fragrant with the forest beneath, and lifted his face to the Sun. "With all the wonders of this world above, they should be very happy."

"Perhaps they are, but I doubt it," said the Chief. "Men seldom value what they have not strived for. Anyhow"—and his face set grimly—"it will not be theirs for long."

"Why not?" The boy looked at him, wondering. "Is the Holocaust coming, really."

"I know nothing of the Holocaust," rang out the voice of Soro Grekko. But we are coming."

The boy blinked. "We?"

"The Utopians have been our enemies, since the Oblivion," his father told him urgently. "For a hundred years and more we have planned to burst the barriers they have set around us, and make ourselves a place in the Sun.

"Always they have been too strong for us. They outnumber us, a thousand to one. The Four taught them a science that is not in the old books, and they have built a great new science of their own.

"I had hoped to lead the attack. I now now that I cannot. But you will, my son, after you are Chief of the Under-men. The dark eyes of Soro Grekko shone fiercely. "You will crush the Utopians, and lead your people back into the light."

"I, Father? But I am so young!"

"You will grow older," his father told him. "For the task will take you many years. But, from this day onward, you are the conqueror of Utopia. You will live for nothing else. Look at those bright towers, beyond the barrier, and promise me that you will take them for the Under-men."

The boy's dark eyes stared for a long time at the far-off shining pylons. At last he turned, with a sober reflection of the Chief's grimness upon his youthful features, and gripped the older man's trembling hand.

"Father," he whispered, "I promise I will take them."

CHAPTER XV

The Eve of the Holocaust

A SENSE of pressing urgency came to Cartwright as he slept. The hour had come. Some vague insistent alarm was sounding in his brain. He struggled against strange shackles of sleep.

He tried to move, but a queer stiff numbness held his limbs. He tried to breathe. But his lungs were filled with something sweetish, choking. It took him a long time even to open his eyes. Finally, when the glued lids opened, he saw only an utter darkness.

A horrible dread seized him. This overwhelming darkness could be only the darkness of the tomb. It was the closeness of his coffin that made the air so bad. This frightful silence was the silence of the grave.

Had some hideous slip of circumstance buried him alive?

Dimly, through the mists that fogged his brain, he groped for recollection. There was something—if only he could remember—something that would explain—

Unconsciously, with a painful tension of effort, he found himself listening. He was straining desperately to hear something. To hear, he knew suddenly, the ticking of a clock.

The clock had stopped!

That fact, somehow, set off a little start of terror in him. Still, however, he couldn't think why a clock should have been buried with him—or why it was terrible that the clock had stopped.

There was something about the Moon. Dimly, then, he remembered little Delorme's rocket, falling in the rain-forest. For a moment he feared that he was still in the rocket, buried under some tropical swamp.

Then he remembered seeing Delorme's body, with the ants at it. Remembered Captain Drumm—the *Pioneer*—the Oblivion—the fortress on the Moon. Then he was buried—under a crater on the Moon! And the clock that had stopped was the one that should have waked him in the year Two Thousand and Two.

He fought desperately, as his brain cleared, to move. To breathe. A terrible dry stiffness froze his body. His skin felt as if it were flaking off in scales. Agony filled his lungs. His limbs were dead.

But he made his fingers, dry and withered and lifeless as they were, find the stud on the wall at his head. Desperately, he pressed it. Light blinded his eyes. Fresh air carried away that sickening sweetness.

For a long time he lay still, content merely to breathe the good air. At last he opened his eyes again. He saw a long ragged crack, across the gray walls and ceiling of the cell. It must have been that crack, allowing the sleep-gas to escape, which caused his awakening.

He looked at his hands. They were drawn, yellowish, dessicated. He touched his face. It felt leathery, stiff, dead. A stiff mass of beard curled down over his throat.

How long, he asked himself desperately, had he slept? Fear was cold in him. Hardly an inch of beard, he recalled, had grown before in thirty years of sleep.

With a dogged effort, he sat up on the bunk. Bones ached dully from the movement. His muscles screamed at effort. His dry skin felt as if it were tearing in rotten strips. Every laboring rise and fall of his chest was agony.

HE stared at the clock-face on the massive door. Its hands indicated four minutes and thirteen seconds after midnight, March 18, 1998. But that meant nothing, for the clock had stopped.

He swayed to his feet. His dead fingers managed to open one of the sealed water bottles on the little table. He rinsed his mouth and gulped the reviving fluid and splashed his dry body with it.

Movement and water began to restore his body's elasticity. He became aware of a gnawing faintness of hunger. Then that was forgotten in an impact of shuddering terror.

Something pretty violent, evidently, had happened to the fortress. What had it done to the others? To Worth and Pat and Captain Drumm? Would the doors and the elevator work? Or were they all buried alive or dead forever?

He stumbled frantically to the door, twisted a key, waited trembling for its motors to respond. The whirring seemed to falter — the door was jammed! No, it moved again! At last it came open, and he staggered out into the narrow corridor before the row of vaults.

Ugly cracks crossed walls and vaulted ceiling. The floor was covered with dust and fragments of shattered concrete. And all the clocks in the doors of the vaults were stopped at that same second, March 18, 1998.

Cartwright staggered along in front of the doors, breaking the little panes of glass and pulling the emergency levers that would start the mechanism to blow out the sleep-gas. He waited, swaying weakly, tense with apprehension.

Presently, one by one, the others came stumbling out to join him. Captain Drumm's red hair had grown into a flaming mop, and his face was hidden by a fiery beard. Mart Worth's pointed satanic beard was longer. Pat Wayland's skin looked dry, but her blond beauty was not greatly changed.

In a voice curiously stiff and rusty, Cartwright told them how he had waked, and ended with the fearful question:

"How long have we been sleeping?"

"Several years, by the look of your beard," observed Martin Worth. He blinked at the cracks and the debris. "A meteor must have struck the fortress, in 1998, so hard it stopped the clocks."

"The sleep gas must have leaked out of your cell," said Pat Wayland. "When the cylinders were empty, the pressure fell. That opened the air-valves, automatically. It must have taken a long time."

"Let's get out of here," gasped Cartwright, "and find out how long."

"If we can get out," muttered Worth.

The elevator, however, operated without difficulty—only such delicate instruments as the clocks had been greatly injured. The section of the fortress upon the peak seemed scarcely damaged. Looking for evidences of the meteor, Cartwright could discover only one tiny new craterlet, near the foot of the mile-high peak.

"Well, Mr. Astronomer?" he called to Mart Worth. "How long would you say we've been sleeping?"

There was, curiously, no reply from Worth. Cartwright walked toward him, around the curving corridor that followed the wall of the fortress, and found him peering fixedly through one of the small northward ports.

CARTWRIGHT looked out, beside him. The first thing that caught his eye was the half-Earth, huge and brilliant against the stars.

"I wonder what has happened there?" he whispered. "Is our Utopia still—Utopia?" But not yet did Worth answer, and Cartwright felt a little tremor of alarm. "What do you see, Mart?" he demanded. "Can you tell how long—"

"There!" Worth's yellow hand pointed. "Are you blind?"

And there, low in the north and below the Earth, Cartwright saw a vast unfamiliar cloud of darkness against the stars. It drowned Lyra and Cygnus and Cepheus, and fell beyond the ragged peaks of Arzachel. Dull green streaks and whorls shone ominously within it.

"Is that—" Cartwright's voice failed him; he clutched Worth's shoulder. "Is it—"

Worth's yellow-skinned satanic head nodded faintly.

"It is the nebula. When we went to sleep, it was a faint telescopic object in Perseus. Now it is spread across eighty degrees of the sky. We have awakened on the very eve of the Holocaust."

"When—" whispered Cartwright. "How long—"

Worth shook his head.

"It is approaching us at seventy miles a second. Within a few weeks we shall meet the outermost fringes.

Probably it will be two months before absorption cuts off the light of the Sun completely."

"And," gulped Cartwright, hoarsely, "then—"

"That final night," said the little astronomer, "will last a month or two, before the light of the meteor-swarms brings the dawn of the last day." He made an odd little jerk of his dark-bearded head. "I should say that life will be possible on the Earth for—at the outside—four months longer."

"Then," boomed the voice of Captain Drumm, behind them, "here is hoping the Utopians have got their plans all laid for the safety of the Earth!"

Worth shook his unkempt head.

"I doubt very much that they have," he said. "I never knew just what exactly we hoped for them to do—I was never able to see what possible human agency would assure escape from the nebula. But, at this distance, the Earth looks quite unchanged. And it is already in the very maw of the Holocaust!"

"Anyhow," Cartwright said, "we'll soon be on Earth to see."

"Not until we've eaten," said Captain Drumm, "and soaked a little water into our dessicated bones."

"And," added Pat Wayland, "until you've done something about those awful beards!"

CHAPTER XVI

The Children of Utopia

AS the *Pioneer* lifted them at last above the grim walls of Arzachel and the Moon's dead plains, the full dreadful extent of the nebula came into view. Standing rigid at the little ship's controls, Cartwright scanned its vast green-shot ellipse with an apprehensive awe.

"It is somewhat disk-shaped," said Martin Worth, "but tilted so that it appears flattened. About sixty billion miles in diameter. The Earth will strike it somewhat toward the galactic pole from the center."

He tugged wearily at the point of his black beard.

"Call it a net of death," he whispered, "and men the fishes. It is sweeping upon us, seventy miles a second. What can we possibly do about it?" He shook his head. "Galt hoped that, in two centuries, our Utopians would be able to turn the trick. But I never really believed—"

He fell silent. As at last they rounded the curve of the Earth, and approached the brilliant hazy convexity of its sunward face, a voiceless tensity of expectation held them all. What had nearly two centuries done to Utopia?

Cartwright traced the cloud-spotted outline of North America.

"It looks just the same," he whispered.

"It will probably look pretty much the same," said Martin Worth, "after it has passed through the nebula—after the fiery hail of meteors has destroyed all life on it."

Pat Wayland stood peering out at the long green-tinged shadow of the nebula. Her face was stiff with an overwhelming dread, her blue eyes huge with fear. From her slack lips came a weary whisper:

"What can men do, against—that?" she sighed. "There can be no escape."

Suddenly, desperately, Cartwright wanted to take her in his arms. He wanted to kiss away the terror in her eyes, and make her smile again. He shrugged, and tried to send his thoughts back to the fate of the Earth.

He knew there was no use dreaming of Pat Wayland.

"We'll land at Star City," he announced, "and see what's going on at the great observatory there."

"If," added Martin Worth, "there is still an observatory there."

The convex planet flatted beneath them. Star City spread out, flung like a jeweled tapestry from the mountains to the city. Wheeling the little ship above its lofty, far-spaced towers, its wide roads and vast airports and well-kept parks, Cartwright felt relief.

"We saw no cities like this, before," he said. "Progress must have carried on. Perhaps, after all, they have found

a way to escape eternal destruction."

"Perhaps," said the cynical Worth.

The observatory stood upon a truncated mountain between the city and the desert. Long rows of laboratory buildings marched across the leveled summit, commanded by the mighty white dome.

Cartwright dropped the *Pioneer* into a grassy, tree-dotted court. Deep-cut letters in the architrave of a splendid building at the end of it read: HALL OF ATOMICS.

A squirrel chittered on the grass as they climbed out of the ship. Fallen leaves scattered the walks. The wind sighed faintly in the fragrant pines.

"It's so quiet!" A faint apprehension dropped Cartwright's voice. "So queerly still."

"An observatory," Worth suggested, "might be busier at night."

HASTENED by a tense anxiety Cartwright hurried along the walk to the Hall of Atomics. A heavy door yielded to his hand. He entered. A heavy silence met him. The air was dead, heavy with stale chemical odors.

He went along the great central corridor, peering into the doors that opened from it. Huge, well-lit laboratory rooms were filled with apparatus that was mostly unfamiliar. All of it was covered with a heavy film of dusk. He went solemnly back to the others, who were waiting at the door.

"There's nobody—anywhere." Something made him whisper. "It has all been abandoned. For years." He led the way back toward the *Pioneer*. "We had better go down to the city, and find out what is the matter."

"Perhaps," said Captain Drumm, hopefully, "they have advanced so far they don't need laboratories any more."

Mart Worth grinned sardonically.

"Perhaps!"

They were climbing aboard the little ship when suddenly Pat Wayland caught her breath and pointed. Thrumming softly, the long tapered spindle of a geoflexor flier came gliding down above the deserted buildings.

The gaily painted craft landed a hundred yards away, beside a dancing fountain. A little crowd of men and women trooped out, laughing. They were oddly and brightly clad, in stuff that looked like silk. One of them strummed a musical instrument, carelessly, while the others spread gay cloths under the trees, and brought baskets from the flier.

"Picnicking, in the shadow of death," murmured Martin Worth. "They have forgotten the danger of the nebula."

But Cartwright fancied a keenness almost of hysteria in their laughter. He caught anxious glances toward the northward sky—where the day's serene blue hid the black cloud of the nebula.

"Let's speak to them."

He called. The picnickers discovered the *Pioneer*, with the four standing about the steps. For a moment there was an astounded, incredulous silence. Then a wild shout:

"The Four! It is the Four—returned to save us from the Holocaust!"

Dropping the baskets, they came running to make an awed little ring about the *Pioneer*. Their faces were eagerly smiling. They reached out trembling, doubtful hands to touch the metal of the little ship.

"You really are the Four?" The speaker was an alert, gray-haired man. His eyes were burning with a tortured anxiety. "Tell us—have you really come to save us?"

"We are the Four," Cartwright admitted. "But there was never anything that we could do about the Holocaust. We only hoped that our efforts would enable men to save themselves."

He searched the Utopian's taut face and asked:

"Have we failed?"

The Utopian slowly shook his gray head, and the brightness of hope upon his face gave way to a weary despair.

"I'm afraid," he whispered, "that we have all failed." He made a tired gesture, to include the laboratory buildings, and the mighty dome of the observatory. "Once I worked here," he said, "before the laboratory was

closed. I was an assistant to Essendee, the great atomic physicist. Once, I remember, he told me he had seen a ray of hope. But—"

The Utopian made a weary little shrug of defeat.

"WHAT was the matter?" Cartwright demanded. "What made you fail?"

"Our philosophers still argue over that," said the Utopian. "But I believe the truth is simple enough. In the first two centuries very little was done—merely because men who expected to die before he arrival of the Holocaust felt little interest in it. It was difficult for men to assume responsibility for posterity. And the failure of the Four to return, as you had promised, was a discouraging factor."

Cartwright nodded.

"We didn't disappoint you intentionally. But go on."

"Thirty or forty years ago," the Utopian said, "when men began to realize that the Holocaust would arrive within their own lifetimes, there was a sudden spurt of advancement. A hundred outstanding scientists appeared. Too late.

"You understand the appalling difficulty of the problem of averting the nebula collision. From whatever angle it is attacked, the obstacles are stupendous. And—so it has always seemed to me—the Utopian temperament was poorly fitted to cope with them."

"How do you mean?" asked Cartwright.

The gray Utopian made a gesture in the direction of the unseen metropolis below.

"You saw Star City? All the cities of Utopia are like that. They are beautiful. All ugliness, all pain, all strife, have been eliminated. All men work together, for the good of all.

"That, I believe, is the plan that the Four made for Utopia. It was a good plan, good in itself. But sometimes our philosophers have suspected that it left out something, made life too automatic, too easy. I don't wish to criticize—"

"That's all right," Cartwright said.

"What you say may be quite true."

The gray man nodded, soberly.

"I know it is. Since we abandoned the laboratories, I have made a garden. There I have seen how cultivated plants breed out. They become weak, easy prey for drouth and blights. Ever and again we must start anew, with a hybrid strain crossed from plants that have been toughened by a harder struggle to survive."

"You say," Cartwright demanded, "that you abandoned the laboratories? Why?"

Dread stiffened the Utopian's face.

"That was nearly twenty years ago," he whispered. "Until then, we had hope. Essendee believed that he had found a way." He stared at the great silent buildings, and shook his head. "We might have beaten the Holocaust."

"Well?" insisted Cartwright. "What stopped you?"

"The Vanishings," said the Utopian.

CHAPTER XVII

Terror by Night

CARTWRIGHT peered in astonishment at the gray Utopian.

"Vanishings?" he echoed. "What do you mean?"

The Utopian shook his head.

"The Vanishings are a mystery that we have never solved," he said. "About twenty years ago, the best of our scientists began to disappear from their laboratories. Apparatus, books, and notes were taken, too.

"The Vanishings always happened at night. They kept on happening, in spite of all we could do. Scientists were taken from under the noses of armed guards, and out of locked roms. We set various scientific traps, with invisible rays and such, in vain.

"Queerly, the scientists who were taken were almost invariably those working on the problem of escaping the Holocaust. Essendee himself escaped, after a battle with an unidentified midnight intruder in this very observatory. But practically every

other man who had accomplished anything at all toward saving the Earth, was abducted."

Cartwright was staring at him.

"A very strange story," he muttered.

"It was incredible to us, at first," said the Utopian. "For there had been no crime in Utopia. Every person has his own secure place in the community, and all his education is directed to make him fit that place. There is no need for crime.

"We had no police organization, here in Star City, until the Vanishings began. Then we organized a force. They did their best, first to protect the scientists and then to find what had become of them. But all efforts failed. And at last our observatories and laboratories were all abandoned, just for the want of able men to carry on."

"Queer," muttered Cartwright. "Very queer!"

"Now," said the Utopian—whose name, he told them, was Arro Fournine—"will you come down into Star City? We must tell Utopia that the Four have returned. Your presence will give people courage to await the Holocaust."

Assenting, Cartwright brought the Utopian aboard the *Pioneer*. At his direction, they landed the little ship upon a great pillar in one of the city's vast parks.

"This is the Pier of the Four," said Arro Fournine. "It was made ready for you, one hundred and fifty years ago."

Above the platform towered a huge stone likeness of the *Pioneer*, a hundred feet in diameter. Their statues stood in a colossal group beside it, giants towering forty feet tall.

A gay-clad, joyously shouting throng was pouring into the park. Cheers rolled, wave on wave of sound, against the great pillar. At last the thousands grew silent, waiting for the Four to speak.

Cartwright made a halting and uncomfortable little talk. He regretted the failure of the Four to return when they had promised. He was sorry that the Utopians had failed to do anything about the Holocaust. The time was now very short. He was not hopeful. But the Four would see what, if anything, could be done.

Silent now, the Utopians began to disperse.

"Trying to start a panic?" inquired Captain Drumm, standing beside the *Pioneer*.

"IT'S time they faced the facts," Cartwright said. "Doesn't it seem to you that they are sort of child-like and naive? Their world has been too perfect for their own good. Life has been too easy for them. They have never learned to face realities. When this supreme danger comes along, they haven't been trained to meet it. They just give up, appalled at their own helplessness."

He looked at the tense faces of Drumm and Worth and Pat Wayland.

"Is there anything that we can do—anything at all?"

The girl shook her platinum head.

"I don't know of anything."

Cartwright turned to Worth.

"Would any sort of ark be possible, to carry men to some planet of another star?"

The little astronomer tugged at his pointed black beard.

"That is probably our only possible chance," he said. "And it is fantastically slender. It would be very difficult to build any sort of interstellar ship, in the few months of time now left to us, and even if we had the best ship we can design, ready to take off today, the chances are that it would itself be overtaken by the nebula before it could build up sufficient velocity to escape."

"But," insisted Cartwright, "is it possible?"

"Barely possible," admitted Mart Worth. "But, even if men did escape in an ark of space, where would they go? Probably only one star in a hundred thousand has any planets at all. Perhaps one planet in a hundred thousand happens to meet the conditions for human life."

He shrugged, hopelessly.

"What ship could visit a hundred thousand stars?"

"Still," persisted Cartwright, "we've

simply got to go on and try *something.*"

"Before we plan anything definite," said Martin Worth, "I want to study the nebula from the observatory here. A great deal of it, you remember, was below the horizon from the citadel."

He called to the gray-haired Utopian, who was standing at a little distance, and asked:

"Will you help us use the great observatory tonight?"

The thin face of Arro Fournine turned pale, and he made an anxious gesture of protest.

"I told you about the Vanishings. We don't use the observatory any more. It is safe enough by day. But, at night—"

His voice trailed off, huskily, and his fingers twisted nervously.

"I must make the observations," Worth insisted, "to find out how long we have. And, as for any mysterious haunters—"

All the V's of his face sharpened to the old cynical grin.

"After all," Captain Drumm told the frightened Utopian, "we are the Four. I think we can take care of ourselves. But we need you, to show us the way about."

They were staring at the Utopian.

"I'll go with you," he said at last. "For the sake of Utopia." He shrugged, unhappily. "I can see that you are skeptical of what I have told you. I only hope that your skepticism is not rudely shattered."

THE red sun was setting when the *Pioneer* dropped them again amid the majestic buildings upon the leveled mountain top. They came off into the silent, neglected grounds. Pat Wayland shivered to the chill of evening in the air. Worth pointed, solemnly, at the sunset-red upon the huge white dome,

"The first warning," he said softly.

"What do you mean?" asked Cartwright.

"The first tenuous wisp of the nebula must have already touched us," said Martin Worth. "There is a slow accumulation of microscopic dust motes in the upper atmosphere. They absorb the violet end of the spectrum. Today, a red sunset." His voice dropped to an ominous whisper. "Tomorrow, a rain of fire."

Arro Fournine kept anxiously close to them, as they entered the great dusky buildings. The air was heavy, musty. Dust lay thick. The silence became terrible to Cartwright. It became as appalling as the dead stillness of the Moon. He started to tiny mocking echoes.

They came at last into the huge dome that covered the main telescope. Arro Fournine, in a dry nervous voice, explained the few novel features of the equipment to Martin Worth.

Electric motors opened the slit in the dome. As it turned slowly toward the north, the red of sunset gave way to the dim shadow of the nebula.

Cartwright touched Worth's arm.

"An odd thing," he commented. "There was dust everywhere in the halls. But you notice there is none in here."

The little astronomer nodded, tugging in a puzzled way at his pointed beard.

"So I noticed," he whispered. "It is odd, too, that the telescope operates perfectly. The oil is not gummed in the motors, there is no rust, the mirror still has an excellent polish."

His whisper sank lower still.

"You would almost believe," he added, "that the observatory has been in constant use!" His dark hollow eyes shot an uneasy glance at Arro Fournine. "We shall see what we shall see."

Worth climbed to the observer's seat at the side of the great tube. The Utopian took his place at the switchboard from which lights and motors were controlled. Armed with the little paralysis guns, Pat Wayland and Captain Drumm and Cartwright moved watchfully about the vast floor.

Night fell without. The ominous red afterglow faded at last. The baleful darkness of the nebula thickened against the northward constellations, touched eerily here and there with green.

As the hours passed, Cartwright could not protect himself from a

mounting fear. He tried not to believe the Utopian's queer story about the vanishings. It seemed quite incredible. The truth, he tried to tell himself, was that these oddly childlike people were hysterical with terror. Probably some of their scientists had merely abandoned a task that looked hopeless, had run away to escape responsibility. And the story had grown with twenty years.

He shook his head, in the thick gloom that filled the observatory. Even that didn't fit. Nothing did. There was some missing factor, whose absence made the whole thing seem a little insane.

HE wanted to whistle, to break that terrible silence. He paced the stone floor of the great dome restlessly, peering vainly into its vast dark spaces. Then silence abruptly became mad confusion.

Pat Wayland made a little gasping cry. Captain Drumm bellowed a shout, and his paralysis gun began to ping. The Utopian screamed. The lights went out. Yellow flame spurted against the darkness, and gunshots reverberated against the dome.

Cartwright heard a dry rustling near him. He thought he glimpsed a gray shapeless shadow moving. He flung up the paralysis gun. But, before he could fire, a dazzling blue light flashed in his eyes, and left him blind.

"Jay!" Terror edged Pat's warning cry. "Behind you!"

He spun. His ears caught some little slither of sound, and he swung his fist at it. The blow met nothing. Flung forward by the force of it, he tripped over something small. His head struck the floor, dazingly.

"Jay—Mart—Cap!" Pat Wayland's muffled voice became a scream. "They've got—"

It ceased, abruptly.

"The lights!" shouted Cartwright. He found the switchboard, snapped on the dim, shaded electrics. Vaguely they showed the huge interior of the dome, the massive telescope. Captain Drumm was standing near the base of it, holding the smoking automatic that he had dragged out of a shoulder holster. Martin Worth was still in his lofty seat.

But Pat Wayland was gone.

"You, Fournine!" shouted Cartwright. "Where—"

He realized abruptly that the Utopian had vanished also.

CHAPTER XVIII

The Ark of Space

Alertly gripping their weapons, they scattered over the vast floor of the dim-lit dome, searching. Cartwright peered into shadows under the great telescope. He tried half a dozen doors, that all were locked. At last the three came back into an apprehensive little group.

"Not a clue!" muttered Cartwright. "I don't see what could have become of them."

Little Martin Worth pointed at the slit in the great dome, that looked out toward the green-shot darkness of the nebula.

"There's a hole you could fly the *Pioneer* through."

Drumm's red head shook.

"We should have seen the shadow against the nebula." Slowly he replaced his heavy automatic in the holster under his shirt. "I didn't quite trust that Fournine guy," he said. "There was something fishy about his story of the vanishings."

"I thought I saw a gray thing moving," Cartwright said. "And somebody flashed a blue light in my eyes. It might have been our Utopian friend, I suppose—if he had a secret exit."

He shook his head.

"Anyhow, Pat's gone—that's what matters."

For a little time they simply stood there, looking at one another. Drumm's bronzed face, usually so ruddy and cheerful, looked pale and grim. The sardonic sparkle was gone from Worth's dark eyes. He was tugging moodily at his beard.

Cartwright was hardly conscious of the stiffness of his own face, the trembling of his lip, until Worth looked

at him with a twisted grin on his narrow satanic face.

"Cheer up, Jay," urged the little astronomer. "After all, we've none of us got more than three months to live, before the nebula bakes the Earth like an apple. Maybe Pat is the lucky one."

At the break in his voice, Cartwright made a bitter little laugh.

"You look solemn enough yourself, Mart," he said. "Funny thing. Here we're all on the edge of tears. But, if we ever see Pat again, all we'll get will be some crack sharp enough to cut your heart open."

Drumm stiffened angrily.

"Maybe—but that is just Pat's way." He peered away again, into the dim-lit spaces of the dome. He listened, and shook his red head wearily. "What *could* have taken her?"

Cartwright saw the gleam of a tear, falilng into Worth's black beard. The little astronomer shook himself, angrily.

"We've got enough else to worry about," he said softly, with a weary little gesture toward the green-and-black of the nebula. "My observations were pretty well complete—and we have somewhat less time than I had thought."

"How—"

A sudden aching constriction choked off Cartwright's voice. For all the malice mingled with her sweetness, he knew he loved Pat Wayland. Fear for her was a cold sickness in him. But he tried resolutely to thrust her blond loveliness out of his mind.

"How long have we?"

"It will probably be less than a month before the radiation of the Sun is cut off completely," Worth said softly. "Then it will get cold. I don't know how cold. Perhaps the air won't freeze. The cold will last perhaps another month—the time depends upon the local condensations we strike.

"THEN the rain of meteors will end that final night. They will burn the oxygen out of the atmosphere, and boil away the seas, and batter down the continents—but we won't be here to see it."

"Then we have perhaps two months to do—whatever we can do."

Worth nodded. "Probably no more. Perhaps less." He grinned a mirthless grin. "That's doubtless long enough for all that we can do."

"We've got to try," Cartwright said. "We're not Utopians. First we'll do whatever we can about Pat—make a search outside, and report what happened to the Utopian authorities—"

"Which," Worth put in cynically, "should help a lot."

"Then," Cartwright went on, "I want to get in touch with the best of the surviving Utopian scientists—our missing friend said, I believe, that this Essendee escaped. We'll discus whatever plan they can offer, add our own knowledge, and see what can be done."

They found the Utopian scientist, the next day, at his cottage in the Alps. A thin bent sharp-eyed man, whose beard was the gray replica of Worth's, he was sitting over a chessboard. He moved a white piece, and the black moved automatically.

He rose stiffly to greet them.

"For twenty years," he told them, "ever since I gave up building the ark, I've been working on this." He touched the board, and shook his bald brown head. "Still I can give it three pieces, and win."

"So you had planned an ark?" said Cartwright. "Why did you give it up?"

"You know how hopeless it is to seek another habitable planet. The only hope seemed to lie in building a vessel large enough to be a little world, itself, in which our little colony could survive indefinitely—until perhaps the Earth, some centuries after its passage through the nebula, might cool and become habitable again."

"Yes—but what was the difficulty?"

"We failed to find any source of power that would move so large a craft," said Essendee. His bald head shook, wearily. "Our copper-cathode power tubes are quite inadequate, even for interplanetary flight. I was at work on a gold-cathode tube, at the time the Vanishings began. That promised to succeed—but for the

scarcity of sufficient gold here in Utopia."

"I think we can find gold—if your tubes will work," Cartwright said. "It was the Vanishings, then, that caused your abandonment of the project."

The aged Utopian nodded.

"All my ablest fellow workers were taken," he said. "All my efforts to find them failed. A panic spread among the few who were left. They fled from the laboratories. I could do nothing alone. And I—I was also afraid."

His hollow eyes stared at him.

"Can you comprehend the meaning of it? Men who have worked beside you for years whisked away without a trace. No clue anywhere. The growing belief that you are being mocked by some totally unknown and far superior science. The ghastly feeling of a secret and unescapable surveillance. The growing conviction that you are going to be next."

The old voice cracked.

"Finally, one night, I was attacked. I escaped—and quit."

"But now you will help us design and build an ark?"

Essendee nodded gravely.

"I WILL," he said. "I believe that every Utopian will rally to your aid—unless, as some believe, the Vanishings are the work of a secret society who have set out to overturn the Law of the Four."

He pushed aside the chessboard.

"Well," Cartwright said, "we had better begin at once."

"I suggest," boomed Captain Drumm, "that we begin drawing up the preliminary plans tonight, and also set about getting the official machinery in motion, to supply men and transportation and materials."

"And I," said Martin Worth, "suggest that we build the ark somewhere in Antarctica. Cold there, perhaps. But in a few weeks all the Earth will be colder. And, since the Earth will strike the nebula north pole-first, the southern regions will be more or less protected from stray meteors—though it will be uncomfortable enough, even there, after the atmosphere becomes incandescent."

"Good idea," Cartwright agreed. "Now, shall we begin with the plans?"

He caught the furtive glance of the little Utopian scientist, and saw the haunted look within his hollow eyes. He knew that the Vanishings were still as terrible, to Essendee, as the on-rushing Holocaust.

THREE days later, Cartwright and Captain Drumm, aboard the *Pioneer*, led a little fleet of Utopian geoflexor fliers to Antarctica. A site was selected for the ark of space, upon a bleak mountain ridge, within ten degrees of the pole.

In the warming rays of huge heaters fed from banks of copper-cathode tubes—for this was June, the middle of the polar night—ten thousand men, under the brisk orders of Captain Drumm, began leveling the ridge and building the mile-long foundation for the ark.

Worth remained in Utopia, completing the plans. Already, all the mills and foundries of three continents were busy, turning out plates and girders for the tremendous metal cylinder that might become the second home of man. An endless line of great geoflexor freighters brought them to the great illuminated yard on the desert of ice.

Cartwright accepted the task of finding fuel for the ark. He went through a simple ceremony, to amend a certain section of the Law of the Four. Then he led a crew to a low, grass-covered mound in what once had been Kentucky.

The defenses that a nation had built to guard its buried hoard proved stubborn. For endless weeks, with the appalling green-lit cloud of the nebula growing larger in the sky night by night, Cartwright's crews drilled and blasted. At last the reluctant earth yielded its reclaimed treasure.

Cartwright returned to Antarctica in the *Pioneer*, carrying a barge loaded with a thousand tons of yellow ingots. Arching high above the atmosphere, he saw a new and ominous halo of crimson about the Sun. He was glad to see that the long hull of

the ark, lying in the glare of a thousand great searchlights, looked almost complete.

Captain Drumm and Mart Worth, however, when he found them leaning over blueprints in a bare little wooden shack in the shadow of the ark, looked worried.

"Well, we opened Fort Knox like an oyster," he said. "We've got the gold. What's the matter now?"

Little Worth tugged soberly at his black beard.

"THINGS aren't going so well," he confessed, and then asked hopefully, "You didn't find out anything more—about Pat?"

Cartwright shook his head.

"I went back three times to Star City. The Utopian authorities haven't found out anything—and don't expect to. I made a gang of them turn the observatory upside down, all over again. We didn't find a thing. But what's the matter here?"

Captain Drumm shook his red head.

"It's these damned Utopians." His great bronzed fists made an angry gesture. "They drive you mad."

"What's the trouble with them? They seem willing enough."

"Too damned willing," muttered Captain Drumm. "That's the trouble. They have no aggressiveness, no independence. When any difficulty comes up, they don't don't set their chins and tackle it. They smile and wait for somebody to help them. Give me a gang of Old World rough-necks—and damn your Utopians."

"Just what is the situation?"

"The way things are going," Mart Worth said, "it will take us at least five more weeks to complete the hull, install the geodes and power plants, provision the ark, bring aboard our selected colonists and the animals we shall try to save, and take off.

"We've time enough to do all that. We can get away from Earth, all right. The danger will come afterwards."

"Afterwards?"

"When we take off," Worth said, "the ark will still have a velocity of nearly seventy miles a second, with reference to the nebula. It is so large that it will take a long time, even with the gold-cathode power tubes, to absorb that momentum and turn back toward safety. "Too long, I'm afraid."

The little astronomer made a weary shrug. Then his dark hollow eyes fastened upon Cartwright's face with a peculiar intensity.

"However," he said softly, "there is another possibility."

Cartwright met his searching stare, wondering.

"What is that?"

"From my telescopic studies of the nebula," Worth said, "I suspect that the edges of it separate into spiral arms. Between those arms, there are doubtless rifts. Even if we lack time to get completely out of the path of the nebula, we might reach one of those rifts—if we had the rifts mapped out."

Cartwright nodded, slowly.

"I see. And I'm to do the mapping."

"That, of course, is up to you. I can't very well leave the job of designing the geodes. I'm afraid that their installation wouldn't progress very fact, without Drumm to boss the job. And it is the sort of thing that your Utopian simply wouldn't care to tackle."

"Of course I'll go," Cartwright said.

Captain Drumm gripped his hand.

"I knew you would," he said. "And I almost envy you." His bronzed face smiling wistfully. "Whether you ever get back or not, it will be the greatest flight a man ever made. Damn these Utopians!"

"DRUMM tried to talk himself into the job." Worth grinned, grew sober again. "You had better spend a couple of days overhauling the *Pioneer*," he said. We have built a set of gold-cathode tubes to be installed instead of the old silver ones—they will nearly double her power. The star-cameras are ready.

"The thing is to fly straight out in the ecliptic plane, toward the present position of Saturn. About eight days of acceleration and eight more of deceleration. That will put you a little

beyond Jupiter's orbit.

"Expose the plates there. And then come back—if you can. If you make it, that will take another sixteen days. By that time, the ark ought to be done. You can tell us whether a passage exists—or whether we ought to be calling it an oven, instead of an ark."

CHAPTER XIX

Into the Nebula

MARTIN WORTH gripped Cartwright's hand. Two days had gone. Equipped with the new power tubes, the big star-camera installed the *Pioneer* was ready to fly. Little Worth tried to grin his old sardonic grin.

"All right, Jay," he said softly. "And don't expose all your plates with the slide still over them."

Cartwright laughed at the catch in his voice, and felt a sudden little ache in his own throat. He turned to Captain Drumm. Splendid in his crimson and gold braid, Drumm saluted briskly.

"So long," Jay," he said. "Don't run into any asteroids."

Cartwright saw the gleam in his blue eyes, saw him turn and cough. He climbed hastily into the little metal egg of the *Pioneer*, and shut the massive valve behind him.

The geodes thrummed, and the little ship lifted above the ark of space. Bathed in a lake of blue light, the mile-long craft lay amid the glaciers. The wind-whipped clouds of an Antarctic blizzard obscured it, and the geoflexor mounted into space.

The appalling green-lined shadow of the nebula came again into view. The Earth contracted to a circle of darkness, against the stars. It's atmosphere was a ring of crimson, that wavered and leapt as if the fire of the nebula were already consuming it.

The Sun, when at last it crept into view beside the receding earth, was surrounded with a wide halo of blood-red light. The strangeness of it made him shudder with an invincible apprehension of the inescapable doom.

The drum of the geodes faltered abruptly. A dead pocket. With the old deft skill he skirted it, kept the geodes in mesh, and escaped its treacherous boundaries.

As the ship's chronometer ticked away the dragging hours, Cartwright stared often, in an appalled unwilling fascination, at the nebula. It resembled an angry thundercloud. Here it shone dimly with the eerie green that once was thought to betray a new element, "nebulium." There, another mass was black against the green. The vanishing stars, at the advencing edges of it, all turned feebly red.

No motion of it was perceptible to the eye. Yet, as time crept away, he could see that boiling currents had changed the ominous outlines of it. He could never forget that it was plunging to engulf the solar system, seventy miles a second.

Often, too, in those endless hours that grew into eternal days, he thought of Pat Wayland. Her bland blue-eyed baby-face dwelt in his mind. Her platinum hair was a bright web that meshed his thoughts. The sweet malice of her smile haunted his dreams.

Vainly, he tried to forget her.

"Pat's just an adding machine," he tried to tell himself, "with an uncomfortable sense of humor and a streamlined case."

But he knew that was a lie. He had glimpsed the real, aching humanity of the girl. He couldn't help a deep pity for whatever cruel experience had made her what she was. And he could never forget that he loved her.

A THOUSAND times he reviewed the evening in the great observatory, when she had vanished. He ran over a hundred fantastic solutions to the mystery—invisible men, cables let down through the slit in the dome, some unspeakable duplicity on the part of Arro Fournine—and knew they were all fantastic.

He knew that he wanted—even more than he wanted to save his own life—to find Pat Wayland, somehow, before the Holocaust should drown

the Earth in the fire of eternal holocaust.

"Even," he muttered to himself, "though there would probably be a dash of poison in the honey of her thanks."

Arching out to southward of the ecliptic plane, where collision with the cosmic debris of the asteroid belt would be less probable, he locked the *Pioneer* upon the controls. Twenty hours had passed since the take-off, when he lay down on one of the long seats and pulled a blanket over him.

And still he couldn't sleep. A fear of meteors haunted him. The ship was armored with two inches of good steel. But he couldn't forget that a missile striking it with twenty or forty times the velocity of a rifle bullet, would carry four hundred or sixteen hundred times the energy. A nickel-iron fragment the size of a walnut—

He shut his eyes, and turned over.

He woke with a start, trembling and tense. He had dreamed that a ragged gigantic boulder was plunging out of the lurid green-black curtains of the nebula, while he struggled desperately with the controls of the *Pioneer*.

"Melodramatic," he whispered to himself. "At thirty miles a second, it could be the size of a barn, and still you'd never see what hit you."

When he woke again, clutching out in frantic alarm, the bunk had dropped away from him. The blanket cushioned his impact against the top of the hull, but he was sick with the vertigo of an endless fall.

The reek of burning insulation somehow cleared his dizzy brain. This was a dead pocket. The pilotless ship had plunged into the heart of it. Now the geodes were burning up with their unspent power.

He snatched at a handrail, pulled himself desperately forward. The ship spun about him. Now and then the fields seemed to mesh unevenly for an instant, setting it to whirling in a new direction.

But he reached the controls. Cut the power. Waited for the heated coils to cool, for momentum to help carry the ship out of danger. Then carefully he returned the coils, inched the power open as the ship crossed the pocket.

At last the geodes were thrumming again, with a full strong note. The ship was off her course, plunging straight into the nebula's green-shot heart. He pulled it back toward the tawny fleck of Saturn.

After a few minutes, sure that the dead pocket was safely behind, he opened the little cabinet that served as a galley, and poured steaming coffee from a thermos jug. His hands still trembled. Evidently, the flight was going to be no picnic.

HE had not anticipated much trouble from the dead pockets. Worth's latest theory connected them with sun-spots, and he believed that they occurred only in the vicinity of strong gravitational fields.

Perhaps, he began to suspect, the approach of the nebula had some connection with them. For, as the days went by, their appalling interruptions became more and more frequent.

He had to sleep. Yet he could never leave the controls without the haunting fear that the geodes would be burned out, while the ship spun helpless in some dead pocket, before he could shut off the power.

That would be the end. Not only for himself alone, but for Martin Worth and Captain Drumm and the ark of space—the end for all. He thought of Pat Wayland.

At last the *Pioneer* came to rest, nearly half a billion miles from Earth. Preparing to expose the plates in the big star-camera, Cartwright was appalled at sight of the nebula.

It had spread to hide all the northern constellations. Lurid green shone beyond the black masses of it, like sinister lightning. The spiral arms of it reached out like hideous limbs, groping for the stars.

But he saw a pale reddish speck, in the midst of its green-black clouds, and voiced a hoarse little cry of elation. For that speck was Vega, shining through the nebula! It was a beacon, in the passage that Worth had hoped he would discover.

Whistling happily against the res-

onance of the hull, he finished exposing the plates, and turned the *Pioneer* back toward the tiny, red-veiled Sun. His tune was interrupted by an appalling, deafening crash.

As the reverberation of the hull died away, he listened with ringing ears for the fatal hiss of air escaping. There was none. But that meteor, as he soon discovered, had been but one of the swarms that had strayed ahead of the nebula.

Ever and again, as he drove the *Pioneer* back toward the Earth, the hull rang alarmingly. Standing hour by hour at the curving control board, it was difficult to keep his mind from a grim mathematics of life and death.

For the velocity of the ship was increasing, at full acceleration. That meant the same thing, as regards the probability of collision, as a vast increase in its length—besides making every collision far more dangerous.

The dead pockets, too, were ever more frequent. Ever and again, dozing over the controls, he woke to find himself being tossed about the madly spinning ship, the air reeking with smoke from the hot coils.

At last he reached the midpoint of the return, and gratefully began deceleration.

The nebula was all about him, now. The Sun still burned feebly through it, a dull, blood-red disk. But all the stars, even in the south, were blotted out. And he began to be tormented by a fear that even the Sun would be hidden—that he would be lost in the nebula, without any familiar point of reference.

He was thin and jumpy with fatigue. His yellow hair was unkempt. A new stubble of straw-colored beard covered his hollow face. His eyes were red and sunken. He began to feel that he would gladly give all his chance to escape the nebula, just for a peaceful sleep.

AS the dim Sun grew back to normal size, however, a fierce elation mounted in him. He was coming through, with the precious plates. He had found the path of safety. He had done his job.

He found the Earth. To Sunward of him, its thin half-circle was dim in the haze of the nebula. It was red with an appalling light. Crescent of crimson fire. He couldn't help a shudder, staring at it. For it was doomed.

Yes, whatever happened the Earth was doomed. Even if the ark of space, by some miracle of good fortune, carried its little colony to some other habitable planet, there could be only a half-life waiting for them.

For man was part of Earth. For millions upon millions of years, life had been shaped and patterned to the days and the seasons, the winds and the tides, to every smallest aspect of this planet that was home. Man, Cartwright knew, would fit no other.

He was staring, in a kind of bleak apathy, at that dim red crescent below the nearer crescent of the Moon. He tried to rouse himself, to recover his lost elation. Only half a million miles to go. Only five hours—

Then the meteor struck.

The concussion was something beyond description as sound. It struck Cartwright like a dazing blow. Reeling from it, he saw a glare of incandescence. He felt pain where a droplet of molten steel struck his face.

For an instant the reek of his own burnt flesh was in his nostrils, and then it was gone. He heard no rush of escaping air, because his ringing ears were deaf. But he saw the flutter of a star-chart—

Saw it vanish through a ragged hole behind him.

For a moment he stared, paralyzed, at the nebula's dull green. He felt a stabbing pain in his ears, a roaring pressure in his head, the swift involuntary expiration. Then his lungs strove for breath, and found only the agony of asphyxiation.

For the air was gone from the ship.

CHAPTER XX

The Final Night

THE pressure in Cartwright's head became a bursting agony. It was

popping out his blinded eyes. He felt the hot spurt of blood in ears and nostrils. But still, in the vacuum that had conquered the ship, he lived.

He would live for seconds, perhaps for even a minute, until the stored oxygen in his blood was exhausted.

He stumbled first toward the gaping hole in the top of the hull. But it was three feet long, larger by far than any of the emergency patches in the rack. There was only one chance—

He reached the air-lock. Blindly fumbling, he caught the inner valve, swung it open. Weak, reeling, swaying, he tumbled into the cramped little space of it. He tried to close the valve.

But a cold prickling had come over his body. Now it ceased. But it left a dead numbness. His limbs were remote dead things, that refused to obey his brain. He tried to cough the strangling blood out of his throat. But, in a vacuum, a man cannot cough.

The metal vibrated to the closing valve, but he heard no sound. He turned the seal-valve. A cold weight of darkness was plunging down upon him. He strove against it. His dead fingers found the air valves.

And at last the oxyhelium breathing mixture hissed into the lock. Gulping it, in great painful gasps, he slumped down into a dim half-consciousness. Desperately he hungered for rest, for peace, for oblivion. But a second emergency came swift on the heels of the first.

The throb of the geodes ceased. The ship lurched and dropped. He knew that it was in another dead pocket—and that the overheating coils would soon be ruined, unless he reached the controls.

He snatched his pressure-suit off its hook. Still trembling, his aching lungs gasping, he climbed into it and closed the zippers and pumped the pneumatic seal.

The blood still streaming from his nostrils spattered the face-plate of the helmet, half-blinding him. But he opened the valve again, and stumbled to the controls.

His thick-gloved fingers trembling clumsily on the levers, he worked the ship out of the dead pocket. The geodes drummed out again, apparently uninjured. Peering through the red-splattered plate, he found the dim red orb of the Sun again.

For an endless terrible minute, he thought that Earth and Moon had been lost in the thickening clouds of the nebula. But at last he discovered their dim red crescents, and set a fresh course for Earth.

The main air-tank on his suit was presently exhausted. But it was easy to replace it with a spare from the racks. At last, triumphantly, he brought the *Pioneer* down toward that bare granite ridge amid the glaciers of Antarctica. Eagerly he followed it, seeking the ark of space.

The lights were out. That was the first alarming thing he saw. He had left the mighty cylinder bathed in a thousand searchlights. Now they were dead. Without their guidance, he searched for a long time across the dimly green-lit desert of ice.

At last he discovered the mighty, mile-long hull, standing high upon its shoring. Stiffened with a strange apprehension, he dropped the mote of the *Pioneer* beside it. No man was alive there to greet him.

TOOLS lay scattered on the ice. The great dock, beneath the gangways, was stacked with crated and bagged and barreled supplies, with walls of gold ingots. And snow was drifted everywhere.

Snow banked the golden walls. It half covered the abandoned tools. It whitened the mountains of supplies. An antarctic blizzard had raged here, he knew, since the ark had been abandoned. It must have been many days ago.

He tried to reconstruct the scene, to find some meaning in the mute ice-bound clues about him. His mind saw the picture as it must have been, before that mysterious tragedy.

The ark of space, looming splendid above the barren glaciers—the last hope of mankind. The swarming workmen, dwarfed to insects by its tremendous bulk, busy with a thousand final details. Stevedores loading

the last cargo of Earth. Animals driven up the gangways, two by two. The selected passengers crowding aboard with their goods, hastening toward the promise of a new world and a new life. Armed guards, doubtless, holding back hysterical relatives and friends, the frantic mob of the doomed. Then, suddenly—what?

Cartwright grappled with enigma. The ark had been suddenly abandoned. There were signs of a battle. The supplies and the billions of dollars in gold had not been disturbed. The people—Captain Drumm and Mart Worth and the thousands of their Utopian followers—were simply gone. The thing was as utterly and numbingly mysterious as the vanishing of Pat Wayland.

Perhaps, he thought, the same unknown agency had been to blame. In his first account of the Vanishings, Arro Fournine had said that all those taken had been working on the problem of escape from the Holocaust. Was there some veiled scientific power, which had decreed that men should not survive the nebula?

Things began to look that way, to Cartwright.

Now—what next?

There was nothing, so far as he could see. It was now obviously too late for the ark to be completed, even if work on it could be resumed. Its building had been the final effort, and that had failed. There was nothing else.

For a long time Cartwright stood gazing hopelessly out through the ports of the *Pioneer*, at the unfinished hulk of the ark and the twilit desert of ice beyond. His weary mind groped for some course of action. But there was none.

He came back, at last, to the needs of his own body. He was trembling, exhausted. For all those weeks of the flight, he had not slept sufficiently, or eaten properly, or been able to relax. He had not recovered from his ordeal in the vacuum.

Mechanically, he opened the faceplate of his helmet and cleaned the dried blood from it. He attached a fresh oxyhelium tank to the pressure suit. At last, wearily, he lifted the *Pioneer* once more to the citadel on the Moon.

That was a refuge, beyond the reach, he supposed, of whatever had taken all his companions and the men from the ark. He could sleep, there. He could rest. And there was nothing else that mattered, any more. For the world was lost.

The Moon was queerly transformed, in the dim crimson twilight. But he found high-walled Arzachel, and brought the *Pioneer* down toward the central peak. The white citadel was unchanged. He anchored the *Pioneer* against a valve, and let himself into the curving corridor. He dragged himself out of the heavy suit—and fell asleep beside it on the floor.

HE woke with a start, and stretched his aching body. Moving heavily, still weary, he bathed, and shaved the yellow stubble from his face, and stumbled at last into the wide white-tiled kitchen where he had so often sat with Worth and Drumm and Pat.

Blackness hung outside the small round ports.

At first, as he listlessly put water and coffee into a percolator and looked in the refrigerator for a slice of frozen ham, there seemed nothing strange about the blackness. Then he realized that the Sun should have been shining.

Icy dread spurred him to a port. Shading its reflecting surface from the lights within, he could see a dying glow of red without. Faintly, it outlined the ragged peaks of Arzachel. He looked for the Earth and the Sun beyond. But he could see only a wall of dull red haze, faintly touched, here and there, with the nebula's own ominous green.

This, he knew, was the final night. He tried to shrug, and limped back to his bubbling coffee. It didn't matter. The end might as well come today as tomorrow. For there was no longer any hope for earth and man.

Cartwright had thought that he was hungry. But the frying ham spent its aroma unnoticed. It crackled and sputtered, as he stood staring at the chair that had been Pat Wayland's. At

last, before he moved, the grease burst into flame.

He discovered it, suddenly, and poured water into the blazing pan, and moved automatically about the business of cooking another piece. And a sort of courage came back to him as he ate.

It was not hope. For there was no longer any hope. It was merely the rising up in him of something stronger than himself. It was the primal drive of race-preservation.

The thing he must do was obvious. The purpose came to him of itself. He examined it with a curious detachment. He saw that the odds were a million to one against it. But even that realization did not stay him.

In one of the shops in the citadel, he found welding equipment. He put on the pressure-suit again, and went out into the thickening darkness that had fallen upon the Moon.

His first task was to remove the outer valve of one of the air-locks from its hinges. The Earth-weight of the massive steel door was five hundred pounds. But, heaving and pushing and straining, he got it in place at last, on top of the *Pioneer*, over that ragged hole.

It took him several hours to weld it in place. Even then it was a ragged and unsightly job. But it would hold air, he knew—until the next meteor struck. At last it was done. He made another hasty meal, and took off again for Earth.

The stark simplicity of his purpose almost appalled him.

The *Pioneer* itself must be the ark of space.

WITH two or three persons aboard, he thought, it might reach that rift in the nebula were Vega had been visible, and so come to safety. To whatever safety, at least, that might exist for the survivors of a lost world, wandering without hope or destination.

He would first land again in Antarctica, beside the abandoned ark of space. He would load the *Pioneer* from the supplies and the stacks of golden fuel there. Then he would look for a son and a daughter of Utopia—

His fevered thoughts went back again to Pat Wayland. If some miracle should discover her, her platinum-haired loveliness beside him would turn this from a bitterly hopeless task into a splendid adventure.

He shrugged, and pushed away the dream. After all, he had no hope of finding Pat. And, even if he did, she would have something to say about becoming the mother of futurity. He could hear the malicious sweetness of her voice.

"So noble of you, Jay. But let's play anagrams."

The Earth had been invisible, lost in the nebula, when he took off from the Moon. He set his course by making observations on the receding Moon. For so short a crossing that should be accurate enough—unless he ran into another dead pocket, and lost his orientation.

Presently the dull crimson disk of the Moon vanished behind him. The Sun made only a dull, indefinite blur. And still the Earth had not appeared. Suddenly the geodes faltered, and a cold numbness seized him.

But, with deft quick hands on the controls, he brought the ship safely past, before the erratic forces of the dead pocket had disturbed the instruments. He set it back upon the course. And at last the Earth came into view.

An Earth queerly changed!

Somehow, it had taken on a strange p e a r l y lusture. The atmosphere seemed covered with a strange shining envelope. The continents and the white blots of cloud were hidden everywhere save at the center of the disk, where he could faintly distinguish the outline of Africa.

A cold dread gripped him. Was that queer film some condensation in the atmosphere from the gases of the nebula? Was it perhaps a toxic vapor that already had annihilated the luckless race?

Another amazing change took place as he watched. Two tufts of flame burst out from the poles of that opalescent globe. A bright, living green —a hue that was oddly familiar—they

sprayed out like the lines of force from the poles of a bar magnet.

The milky envelope had been frightening. This was the sheer incredible. Before he could make even an effort to comprehend it, he saw the great meteor.

A vast rock, ragged and dark, came plunging through the greenish-black streamers of the nebula. A dazzling trail of pale-blue luminescence was left behind it.

For an instant, Cartwright thought that it would strike the *Pioneer*. One hand tensed on the pilot rod, in a desperate effort to fling the little ship aside. The other came up in an automatic useless gesture, to shield his face.

IN an instant, however, he realized his mistake. That hurtling mass was far larger and more distant than had been his first dazed impression—otherwise its terrific velocity would have made it quite invisible.

Staring in a paralysis of dread, he saw that it was moving apparently toward the Earth. Its mass, he knew, must be countless millions of tons. The violence of its impact, if it struck, might shatter a whole continent.

What if it did? Numb with horror, he made a little apathetic shrug. When the world was doomed, what mattered a few days more or less?

If there were any survivors, when he landed with the Pioneer—

His thoughts were frozen. Stiff with wonderment, he stared at that strangely altered planet, and then back at his instruments. He shook his bewildered head, made hurried observations and frantic calculations.

Then he shouted.

"Moving! If I'm not crazy — the Earth is moving—out of its orbit! And that meteor is going to miss it!"

What could have happened, to move the planet? No answer was conceivable. Trembling with a sudden breathless hope and an equal dread, he changed the course of the *Pioneer*, to follow.

And the little geoflexor plunged into another dead pocket. It was the greatest that Cartwright had struck. For an hour the tiny ship spun helpless, her drive fields refusing to mesh.

At last the geodes thrummed again. Cartwright searched eagerly for the moving Earth. But it was gone. The nebula had thickened about him. Even the vague crimson blur of the Sun had vanished. There were only green-black clouds, and the great meteor with its shining trail.

CHAPTER XXI

The Shining Door

THE meteor itself, however, and the direction of its luminescent trail, restored Cartwright's orientation. He knew the course that the inexplicably moving Earth had taken, with reference to the meteor. He followed.

And suddenly the amazing planet burst out of a wall of ominous cloud. It was a huge globe of milky light, thrusting brushes of green fire from its poles. With the dust-clouds of the nebula whipping past, at scores of miles a second, he feared that he would lose it again.

He feared, too, that its incredible motion would draw it away from him. But its curving progress remained deliberate, and the *Pioneer* drew toward it.

At last, at an elevation of eighty miles, Cartwright came down into that opalescent envelope. A thin silver haze surrounded the ship, while he dropped forty miles. Then it cleared again, and made a silver dome above him.

He gasped at what he saw below.

He was descending over Antarctica. His grimly hopeless plan had been to land at the abandoned ark of space, to provision and refuel the *Pioneer*. Now this motion of the Earth—a thing beyond comprehension—might make his plan either needless or futile. In any case the stack of golden ingots for the power tubes was almost exhausted. Whatever was to come, they had to be replenished—

But even that purpose was swept

from his mind by the wonder of the thing he now beheld.

The ic-bound convexity of the polar continent lay beneath him. Rugged mountain ranges thrust grim black summits above endless seas of hummocked, fissured ice. And all that frozen desert was illuminated by the strange pale luminescence of the silver sky, and by an incredible pillar of weird green flame!

Far south of the granite ridge where the ark of space had been abandoned, full upon the polar plateau itself, rose a vast, flat, disk-shaped structure. It was a thing, Cartwright's benumbed brain reckoned, thousands of feet in diameter. And straight up from its center rose that supernal column of green fire! It was that same mighty jet of mysterious light that made the far-spreading brush of fire above the silver haze.

So Cartwright didn't land at the ark. He drove the *Pioneer* straight toward the base of that shining column. He had to know about this colossal construction and the light above it if it was the last thing he ever knew.

For this—this mighty, incredible phenomenon — must be what had moved the Earth!

He was afraid, but it was a fear compounded of awe. All his body was cold and stiff with apprehension. But an eager hope was burning in him too. . . .

He dropped the *Pioneer* upon a glacier slope, beyond that Cyclopean disk. It was a curving wall of gray metal. It rose straight out of the ice. The top of it, he estimated, was five hundred feet above him.

His approach had not been challenged. He saw no men. Nothing was moving. There were no doors, on any openings, in that metal wall. He waited, anxiously watching through the ports. Nothing happened.

AT last, moved by the desire for a closer examination of the thing, he opened the *Pioneer's* valves, and climbed down upon the ice. A drumming sound reached him, from that mighty disk. It was infinitely deep. It suggested infinite power. A rushing, like that of a far hurricane, came down from the pillar of flame.

It was far warmer, outside the ship, than he had expected. This was the dead of the Antarctic winter. Even without the greater cold caused by the interception of sunlight by the nebula, it might normally have been fifty or eighty below zero. Actually, however, it was not quite freezing. Little pools of water were standing on the ice.

That high silver haze, Cartwright realized, must be radiating heat as well as light! His brain jumped to the incredible but correct conclusion—this power could make the planet independent of the Sun's radiation!

In awe and bewilderment he walked bewilderedly toward that mighty gray wall. Its great size made it deceptively near. But at last he came to it, over the slippery ice, touched it. It was steel. He could see the seams, where tremendous plates had been welded. It vibrated faintly, to that deep reverberation.

There was no opening in it. After a little time, Cartwright turned to go back to the *Pioneer*, across the weirdly green-lit ice. He was shaking his head, baffled.

"Hi, Jay!"

For a moment he kept plodding on, his brain not registering that amazing call. Then his heart heaved upon him —Pat Wayland's voice! He wheeled. The breath went out of him.

Something had happened to a tall oval section of the steel wall behind him. It was shining with a faint bluish light. It was ghostly, transparent. And Pat Wayland was running out of it, as if it had been no more than a barrier of smoke!

"Jay! Jay!" Her cry was clarion-like with a sob of joy beneath it.

He caught his breath, stumbled toward her. His anxious eyes were devouring her. She wore strangely cut garments of some white, fur-like stuff. Her platinum head was bare, and her blue eyes smiled at him, joyously.

"Pat! Pat!" His incredulous eyes went back to the blue-shining doorway in the wall of steel. He saw little Mart Worth standing beyond its smoky transparency, and thought he

glimpsed the bright uniform of Captain Drumm. And there was a tall, strangely attired figure who looked curiously like Lyman Galt! He looked bewilderedly back at the girl.

"Pat," he faltered . . . "this is . . . a dream. . . ."

Her hand seized his. He gripped it, clinging to the warm strong reality of it and looked anxiously into her white face. She shook her shining head, happily.

"It isn't a dream, though it's all wonderful enough to be one."

Like a sleep walker, he looked back at the glowing, smoky oval. It was real. Pat was real. It was all real. And now he found tongue, masked his stormy emotions.

"How about that?" He searched her face again. "How did you get out here, Pat? I may be crazy—but I thought I saw you come walking through a solid steel wall."

Her laugh was like the chime of a bell.

"So you did, Jay—and that isn't the strangest thing you will see."

He held on to her hand. This, at least, he would not deny himself.

"It's just one surprising little scientific discovery of the Under-men," she explained. "One of their scientists was looking for a way to make more space for them, underground. He developed a force-field which polarizes the electrons. Two pieces of matter, polarized in different planes, are interpenetrable. The discovery was not successful for the original purpose, because the polarization lasts only a few seconds after the power is turned off. But it does enable men to walk through walls—or floors."

Cartwright started.

"So that's how you were taken, Pat?"

Her shining head nodded.

"A band of Under-men came up from their tunnels, through a polarized section of the floor. They had been coming every night, to observe the nebula. They simply took the opportunity to avail themselves of the services of one of the famous Four."

She laughed again. He had never heard her laugh like that before.

"These Under-men?" he demanded. "Who—"

"They are the children of the renegades," she told him. "Their leader, Kran Grekko, says that he is the great-great-great-grandson of Silver Skull—do you see an amazing likeness to Lyman Galt?"

"Galt? Yes!"

CARTWRIGHT'S eyes flashed to the fading oval of the strange door, and the girl nodded. Her blue eyes turned serious.

"It seems there was something wrong with our great Plan, Jay. Our Utopia failed. It was the renegades, whom we tried to destroy, who made the real advance. Because, I suppose, they had to advance in order to survive at all. Now it is they who have saved the Earth."

"They are really moving it?" Cartwright gestured, dazedly, at the great disk and the pillar of shining green above. "With—this?"

Pat Wayland nodded, smiling at him a little tremulously.

"They are. The Earth is now a ship. If this disk were smaller, you would recognize it as a geode-element. It differs only in size from the one of the geodes on the *Pioneer*. There is another like it, moored at the north pole. All the planet is meshed in their geoflexion field."

"The Earth—a ship!"

Cartwright's amazed eyes lifted to the silver vault above.

"It is a ship," the girl said softly. "The Under-men have developed an iron-cathode power tube that is many times more efficient than anything we had, and their deeper tunnels have found fuel enough."

Her white arm lifted.

"That silvery gas, floating above the atmosphere, prevents too rapid radiation of heat. It is excited to fluorescence by the cosmic rays. So, wherever we voyage in space, we'll have heat and light.

"There will be no days or nights, of course. The climate over all the planet will be mild and comfortable. An eternal spring, Worth promises. You see that the ice is already thaw-

ing, down here in Antarctica."

Her blue eyes were shining.

"Isn't it wonderful, Jay!" Her voice had an eager ring. "The Earth is safe. It's free. Now it can cruise through space, from star to star, wherever man shall guide it. A new era has come, of knowledge and freedom and power. Men are now the masters of their environment, and not the slaves."

A sober little hush came into her voice. "Our job, that we planned so long ago—two hundred and thirty years ago—is done. Aren't you happy, Jay? Isn't it grand?"

Suddenly her blue eyes were peering at him curiously. "What's the matter, Jay? Aren't you glad?"

He shook his yellow head, with a dazed little grin.

"Oh, I guess I'm glad—of course I'm glad. What I mean is—well, I'm still sort of confused and tired. I don't know quite what to think. But it looks like everything is going to be all right. There's nothing more to worry about, I guess."

He looked at her slim blond loveliness. "What about you, Pat? What are you going to do?"

It was a little time before she answered. He saw a little wet gleam in her huge blue eyes, and she blinked.

"I don't know, Jay," she said slowly. "I don't know. I have been working to help save the Earth for so long—putting that first, and trying to forget everything else—so long, that nothing else seems quite real. I guess I'll find something—sort of begin over again, somehow."

Her soft voice caught.

"How—how about you, Jay?"

It wasn't any use, Cartwright knew, to tell her what he felt. But it had been bottled up in him too long. And now, in this dazing moment of victory, no possible rebuff seemed to matter very much.

It came rushing out of him.

"You know I love you, Pat. I've told you before. It's probably no use to say it again. And please forgive me if I hurt you. I don't know what makes you like you are. Whether you loved Galt, or someone before. But—well, I just can't help loving you."

He stopped, then, staring at her. He had expected one of her old malicious wise-cracks. But suddenly she was laughing, and then he saw that she was crying, and then he didn't know which she was doing.

Words filtered through her paroxysms.

"Once I thought I loved Lyman. That was why I first joined his Utopia Corporation. But that left no time, no room, for anything. The approach of the Holocaust, it seemed to me, made all love madness. I'm afraid I showed my bitterness and anger. But now—"

Cartwright had never understood Pat Wayland.

Now he was astonished when she flung her arms around him, and kissed him eagerly. But not too astonished to make the fitting response.

Next Issue: THE THREE PLANETEERS, a Complete Book-Length Novel of the Spaceways by EDMOND HAMILTON

YOU PEOPLE MUST BE CRAZY TO GIVE AWAY SHAVING CREAM

-CRAZY, NOTHING!-NEARLY EVERY 20-SHAVE SAMPLE OF LISTERINE SHAVING CREAM WE GIVE AWAY MAKES A CUSTOMER!
WHAT'S THE ANSWER?
LAMBERT PHARMACAL CO.
IT'S THE LATHER! 24 QUARTS IN THE REGULAR TUBE-ENOUGH FOR 3 FULL MONTHS-SO RICH IT REALLY SOFTENS WHISKERS-AND SOOTHES!-WELL, TAKE A TUBE AND SEE FOR YOURSELF!
IT BETTER BE GOOD!
-MY BEARD'S LIKE WIRE
-THAT SAMPLE TUBE SURE MADE A CUSTOMER OUT OF ME—SMOOTHEST SHAVE I'VE EVER HAD—
-AND DON'T FORGET MA, WE MAKE A SWELL BRUSHLESS CREAM TOO!
ONE WEEK LATER

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THE CONQUEST OF THE IMPOSSIBLE

A Guest Editorial

By RALPH MILNE FARLEY, M.A.

FAMOUS SCIENTIFICTION AUTHOR

THE British Patent Office used to have a practice of rejecting all patent applications which involved perpetual motion. Perpetual motion was inherently impossible, they said. But finally an applicant, who claimed to have invented perpetual motion, appealed and carried his case clear to the House of Lords.

The Lords overruled the Patent Office, in a learned opinion bristling with instances of things which scientists had unanimously declared impossible, but which later had come to pass. So the Lords held that each patent involving perpetual motion must be considered on its own individual merits, precisely like a patent in any other field.

When the steam locomotive was first invented, scientists shook their heads and prophesied that human beings could not travel at a speed of 20 m.p.h. and live.

Ralph Milne Farley

With the exception of the lamented Professor Langley, scientists were agreed that man would never fly.

Yet, even when confronted with these instances of mis-prophecy, the scientists and pseudo-scientists of today ponderously explain that, although their ilk were wrong before, nevertheless perpetual motion and time traveling are in quite a different category—that it can be *proved mathematically* that these things really ARE impossible.

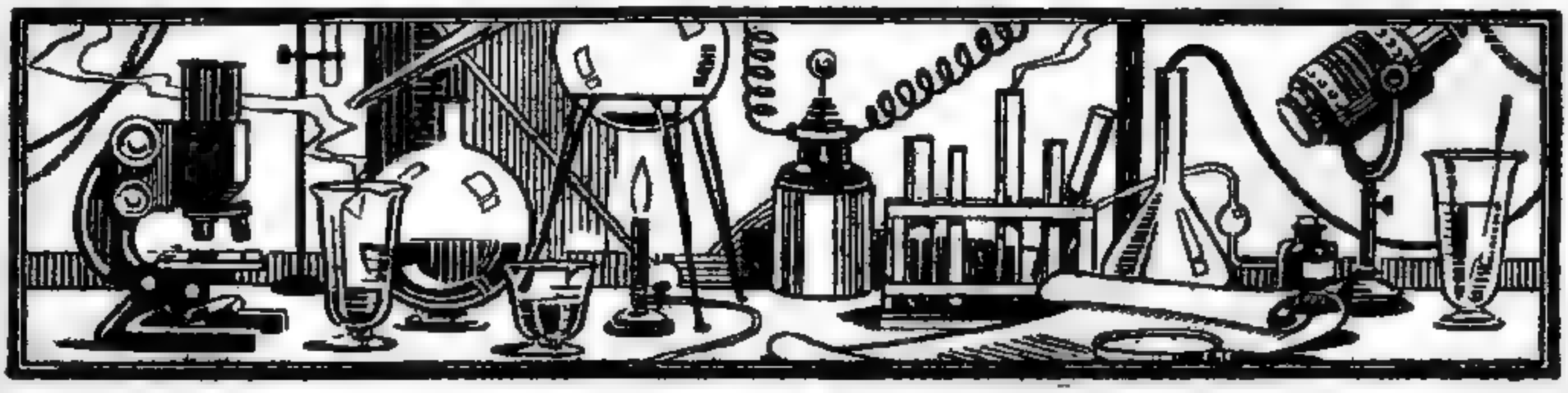
Perpetual motion violates the law of conservation of energy, they say. Who enacted that law? "Laws of nature," so-called, are not laws; they are merely generalizations from observed phenomena, always open to the discovery of exceptions.

Time-traveling violates the principle that you can't have a time-rate-of-change of time, they say. Why not? You can have a space-rate-of-change of space: dy/dx. Ah, but, they dogmatically reply, there are *three* space dimensions, and only *one* time. Quite so. But a space-rate-of-change of space is possible along a one-dimensional line: dx_2/dx_1. So why not dt_2/dt_1?

Gentlemen of science, we the authors of science-fiction are one jump ahead of you. Holland's submarine patent was declared invalid as anticipated by Jules Verne's novel. The U. S. Patent Office rejected an automatic radio-relay on the strength of a gadget in one of my Radio Man stories. And when you yourselves finally perfect perpetual motion, time travel, thinking robots, etc., it will again be found that we have beaten you to it.

So don't be too dogmatic about your unbreakable "laws of nature." Nothing is impossible!

(Note: Prof. Farley, in addition to being a well-known author of science-fiction, is the holder of a number of patents, and is Lecturer in Physics at Marquette University.)

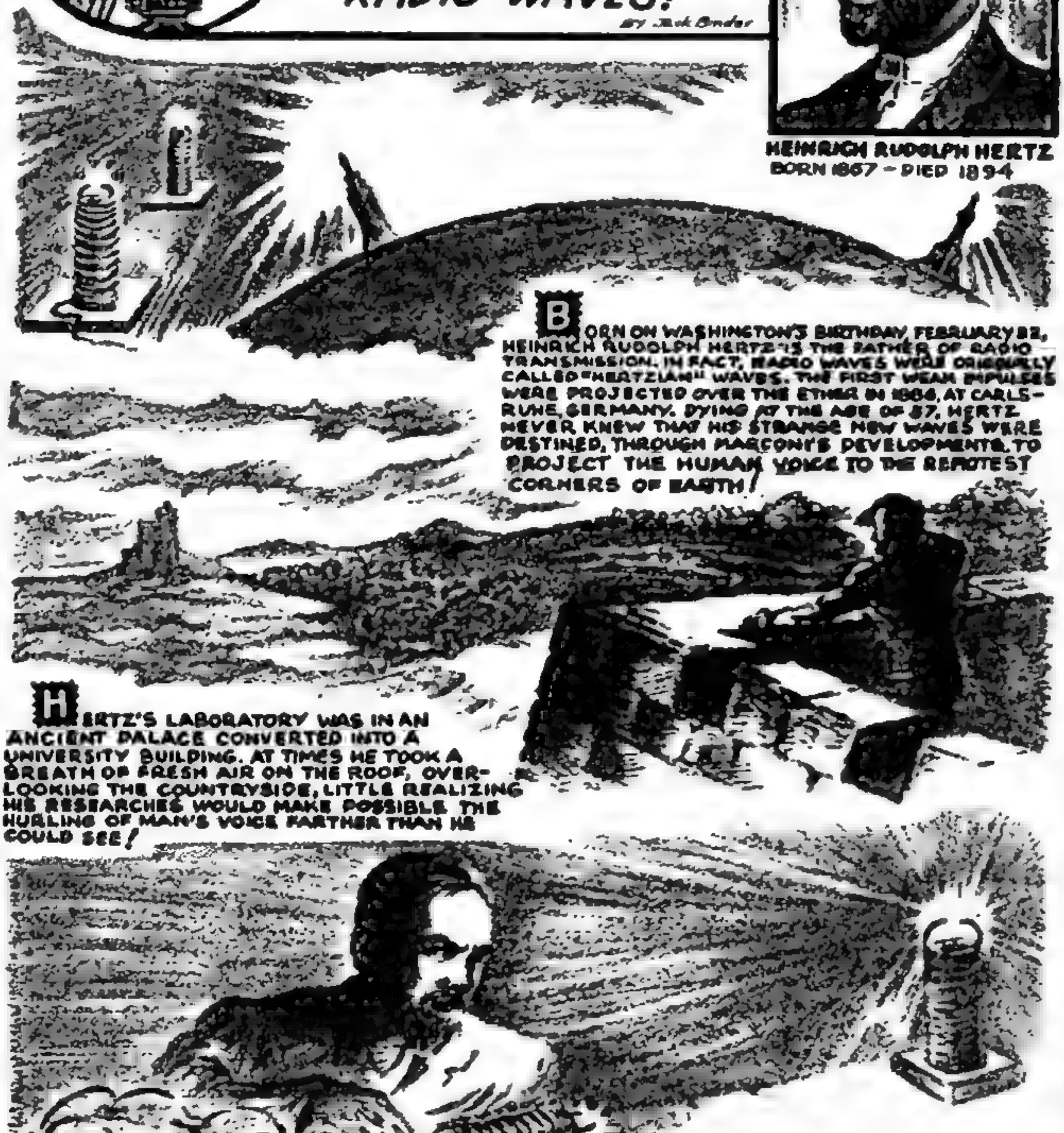


THE LIFE STORY OF HEINRICH R. HERTZ

WHO DISCOVERED RADIO WAVES!

By Jack Binder

HEINRICH RUDOLPH HERTZ
BORN 1857 - DIED 1894



BORN ON WASHINGTON'S BIRTHDAY, FEBRUARY 22, HEINRICH RUDOLPH HERTZ IS THE FATHER OF RADIO TRANSMISSION. IN FACT, RADIO WAVES WERE ORIGINALLY CALLED "HERTZIAN" WAVES. THE FIRST WEAK IMPULSES WERE PROJECTED OVER THE ETHER IN 1886, AT CARLSRUHE, GERMANY. DYING AT THE AGE OF 37, HERTZ NEVER KNEW THAT HIS STRANGE NEW WAVES WERE DESTINED, THROUGH MARCONI'S DEVELOPMENTS, TO PROJECT THE HUMAN VOICE TO THE REMOTEST CORNERS OF EARTH!

HERTZ'S LABORATORY WAS IN AN ANCIENT PALACE CONVERTED INTO A UNIVERSITY BUILDING. AT TIMES HE TOOK A BREATH OF FRESH AIR ON THE ROOF, OVERLOOKING THE COUNTRYSIDE, LITTLE REALIZING HIS RESEARCHES WOULD MAKE POSSIBLE THE HURLING OF MAN'S VOICE FARTHER THAN HE COULD SEE!

HERTZ FULFILLED A HALF CENTURY OF PREVIOUS SCIENTIFIC THEORY. FARADAY AND CLERK-MAXWELL BEFORE HIM HAD SUSPECTED THAT THE MYSTERIOUS "ETHER" COULD CARRY OTHER ELECTROMAGNETIC VIBRATIONS BESIDE THOSE OF ORDINARY LIGHT. IT REMAINED FOR HERTZ'S PIONEERING GENIUS TO SEND HIGH POWER THROUGH A BAR IN A SPARK-COIL, INDUCING THE SAME SPARK IN A SIMILAR, THOUGH UNCONNECTED COIL NEARBY, THUS TRANSMITTING WIRELESS VIBRATIONS FOR THE FIRST TIME IN HISTORY. HERTZ'S FIRST RADIO "BROADCAST" WAS FOR A DISTANCE OF FIVE FEET!

Next Issue: THE LIFE STORY OF BENJAMIN

THEY CHANGED THE WORLD

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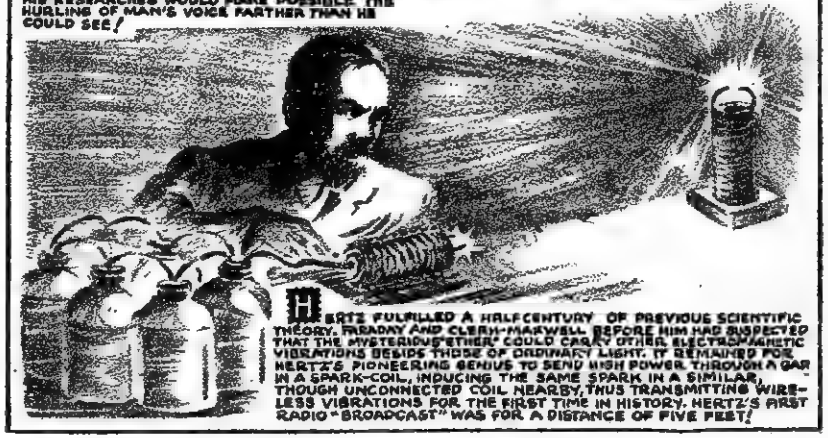

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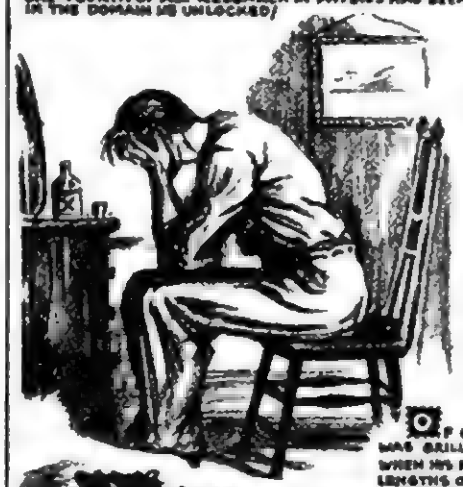

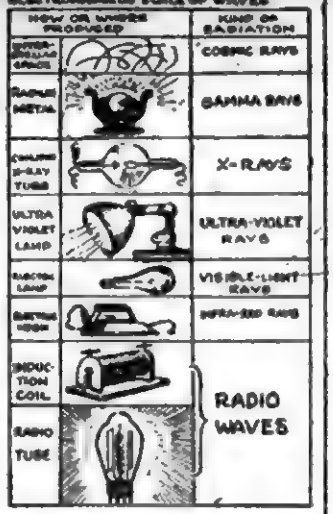

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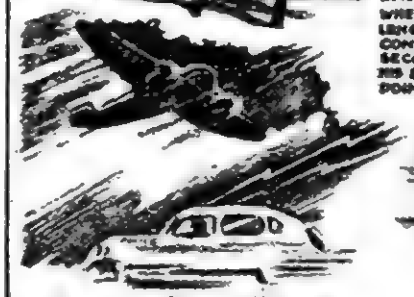

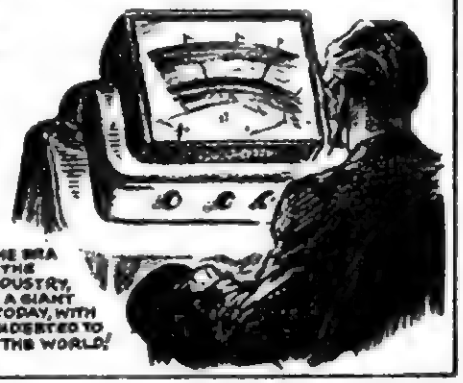

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FRANKLIN, the First of American Scientists

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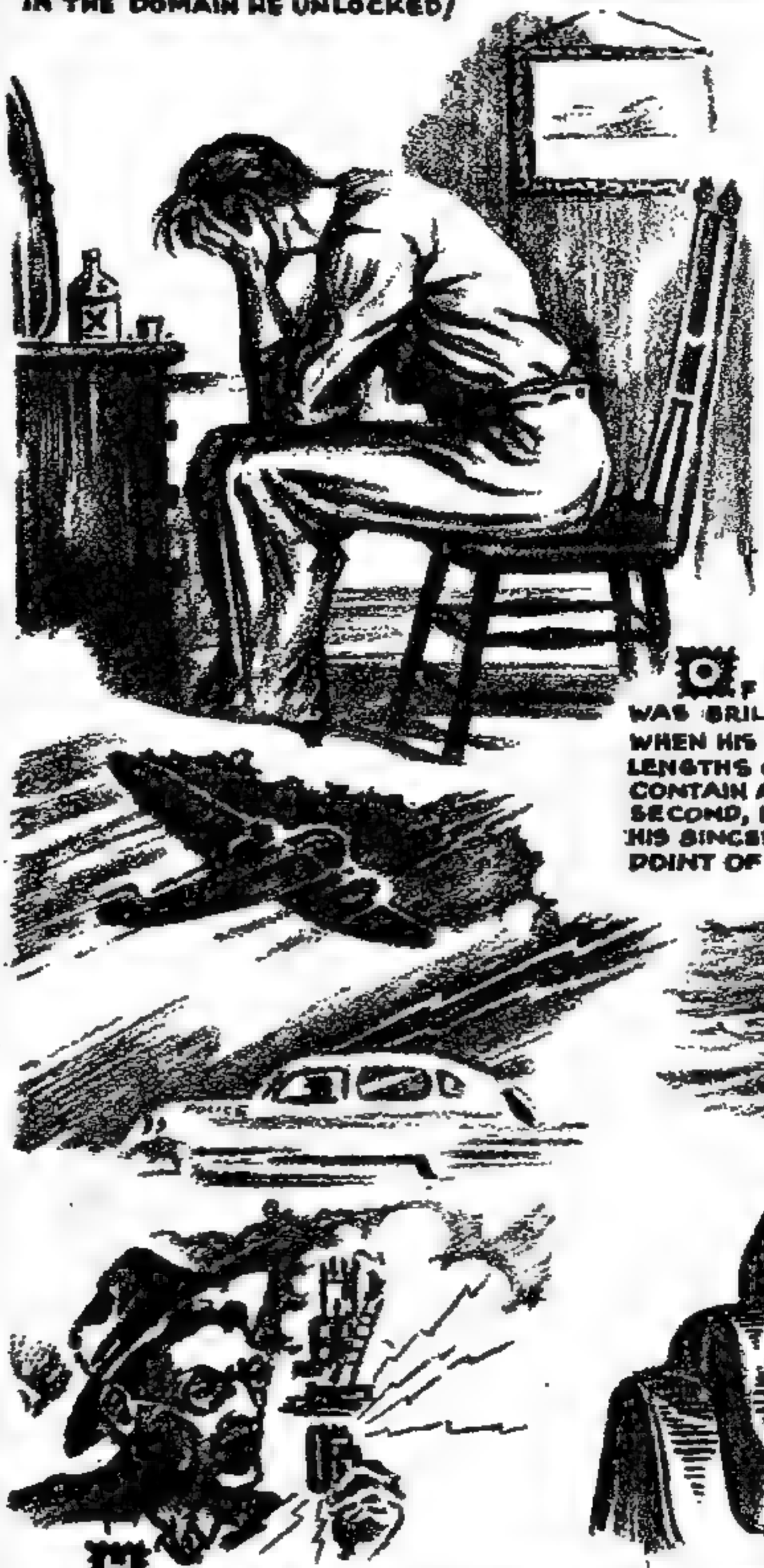

ELECTROMAGNETIC SCALE OF WAVES

HOW OR WHERE PRODUCED		KIND OF RADIATION
INTER-STELLAR SPACE		COSMIC RAYS
RADIUM METAL		GAMMA RAYS
COOLIDGE X-RAY TUBE		X-RAYS
ULTRA VIOLET LAMP		ULTRA-VIOLET RAYS
ELECTRIC LAMP		VISIBLE-LIGHT RAYS
ELECTRIC IRON		INFRA-RED RAYS
INDUC-TION COIL		RADIO WAVES
RADIO TUBE		

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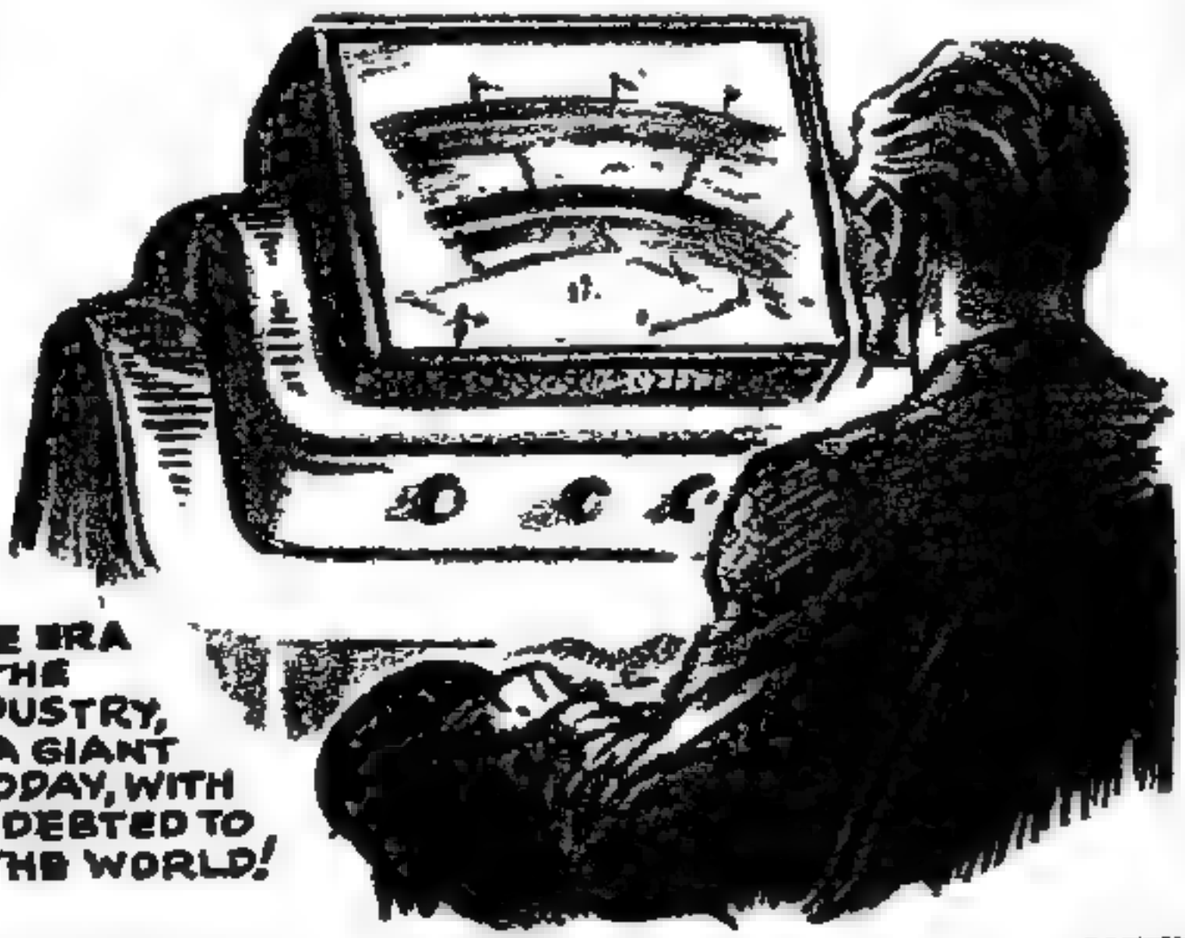

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THREE WISE MEN

A Time-Traveling Machine Explodes on a Millionaire's Doorstep

By

LLOYD ARTHUR ESCHBACH

Author of "The Time Conqueror," "The Meteor Miners," etc.

They introduced themselves as visitors from the Forty-third Century, A.D.

NOW, listen, Sergeant, I've got some information that you really ought to get. I guess I'd be better off if I kept my mouth shut, but—well, this Doctor Stoner you're holding is innocent. He didn't murder those three freaks. They—just died.

There's a lot to this case that you don't understand, Sergeant. Doc Stoner and I are the only ones who know the inside story. And he won't talk.

Who, me? My name's Tom Dorion. Age thirty-two. I'm a freak-hunter for the Empire Circus combine—you know, the outfit that bought out Ringling and Barnum . . .

Oh—I just keep hunting up freaks for the shows. Whenever the boss gets a lead on something new and big for the midways, he sends me out to sign 'em up. Between times I keep roving, scouting for material.

Where do I cut in on this case? That's what I want to tell you. It's a long story, and I'm not much of a hand

at talking, but here goes. About two months back, I'd just returned from Borneo with a two-headed snake, and a Dyak boy with a pair of singing parrakeets, when the big boss—that's Joe Wallace—called me into his office. I could see right off that he didn't feel like patting me on the back and handing me a cigar, and, suddenlike, he jammed a newspaper into my hand and pointed to a headline.

"Look!" he yelped. "Somewhere out on Long Island are three freaks—little guys with big heads—and I want them for my shows! They're gettin' a swell build-up. An' you're gonna sign 'em—or else!"

I didn't like that "or else," but I didn't say so. I just looked at the article. Maybe you read it, too, Sergeant—most everybody did, I guess. Anyway, I have the clipping here, and if you don't mind, I'll sort of skim over 'em, just to refresh your memory.

THREE WISE MEN COME OUT OF FUTURE

Ambassadors From Tomorrow Appear at Long Island House Party

SCIENTISTS ASTOUNDED

Long Island City, July 9—A house party at the country estate of Oliver P. Mawson, millionaire automobile manufacturer, came to an abrupt and thrilling termination last night with the appearance of three uninvited guests. With more than two hundred famous people present, including the leading figures in artistic, scientific and financial circles the party reached its height at about 2 a.m., when a terrific explosion shook the sumptuous Mawson mansion. Shouts were heard from the lawn outside, and excited guests streamed into the night.

A startling spectacle greeted them. The entire western sky was lit up by a strange greenish light rising from a little hill a hundred yards away. And in that unearthly glow they saw a huge polished metal cylinder sprawled on the hillside, its lower end twisted and torn by the explosion which had gouged and blasted the hilltop, uprooting several young trees.

As the guests reached the hill, they heard sounds within the metal cylinder, and one after another, three strange small men crawled out. Almost identical in appearance, they were little more than four feet in height, and their bodies, covered only by white sleeveless shirts of some soft silky material, and flaring white shorts, seemed amazingly thin and fragile, though tanned a golden brown. Their heads, completely bald, were enormous, being fully twice the size of normal human heads. And their faces, thin almost to the point of emaciation, were old and wrinkled, with deeply shunken eyes and thin, indrawn lips, the whole somehow grotesquely out of proportion with their huge heads.

SCIENTIST INTERVIEWED

In an interview, Roger St. John, noted astronomer and writer, stated: "I never saw a more startling spectacle. That green glow which seemed to emanate from the very earth of the hilltop, cloaked those three little men with an air of the unearthly. It stunned us. There was something almost juvenile in their faces, yet with it was something so incredibly ancient that—well, it marked them as creatures of another world—or time!

"It seemed almost as though they had stepped from the pages of a Wellsian fantasy—men from the future. When one of them spoke, his voice was peculiarly flat and bore an indescribable accent.

"'A slight miscalculation, Lon,' he said, 'doubtless due to the changing contour of the Terrestrial surface. We should have raised our supports two feet higher.'

"'Fortunate that our miscalculation had no more regrettable result than the loss of our Time-drive,' replied the second little man dryly.

"The third waved a hand toward us and said in the same flat voice, 'We have audience, comrades.' And the three walked slowly down the hillside."

COME OUT OF FUTURE

After the excited throng escorted the strange visitors into the great ballroom of Mawson Manor, and subsided to a point where intelligent conversation could be carried on, the three introduced themselves as "Lon St-228-86," "Ander Cw-741-22," and "Ken Mb-390-54," visitors from the Forty-third Century, A.D., or the year 2351, New Era. They had come back into the past, so they said, to view at first hand what their history indicated was the first year of the New Era—this very year.

There followed an animated discussion, during which the visitors were dubbed "The Three Wise Men," for they revealed a startling knowledge about everything. The effect of this discovery was startling . . .

WHAT'S that, Sarge? . . . Well, okay. Anyway, maybe it gives you an idea how I felt when I looked at Joe Wallace after I'd finished reading the thing. I opened my mouth—

"Don't say it, Dorion," he snapped. "I'm dumb enough to give you credit for having a *little* brains—an' if you try to tell me you're fallin' for this

time-travelin' bunk, I'm liable to get sore. Look! You scram over to that Mawson guy's joint an' stay there till things break. Sooner or later the bottom'll fall outa the story these three big-headed freaks are dishing up, an' when it does, I want you there to sign 'em!"

I didn't waste much time getting out to Mawson's little fifty-acre estate on Long Island, but getting inside was something else. A faked reporter's card didn't work. Neither did a black bag, a pair of spectacles, and a doctor's front. So—well, I got in, but I was glad there didn't happen to be any police around.

After I brushed the dust off my soup-and-fish, there wasn't anyone could tell me from the other guests. When I first saw those three little men —well, it was an experience. The papers hadn't stretched things a bit. Boy, I figured, if Joe Wallace could get them, we sure had three world-beaters on our hands.

This guy Mawson had sort of set himself up as proud father and legal guardian of the Three—and let me tell you, he did things right. Some of those feeds of his would set you back twenty bucks in a Manhattan hash house.

The second day, Mawson arranged an interview with the press. Never saw such a mob of reporters before or since. The scientists were there, and —well, when the lid blew off, and the physics, astronomy, higher mathematics, biology and all the rest of that bunk started flying around sort of casual-like, the Three Wise Men got to telling the scientific big shots where to head in. Those little guys knew everything!

There was one egg there, a German scientist, who thought he was pretty hot stuff. Seems he'd written a book called "Atoms, Protons and Positrons, the Building Blocks of the Universe." The way he looked at it, now there was nothing more to be said. He mentioned his work, and Ander—he was the only one of the Three with a sense of humor—started spouting a chapter of the book, word for word! Just sat there looking at nothing while the syllables rolled out in that flat, hollow voice.

I could see the Dutchman swelling up like a balloon—not thinking of the brains this little man had, but of how important his work was to be remembered two thousand years in the future. Then Ander said, sort of soft and gentle:

"We preserve some of the more absurd of the ancient writings as entertainment for the children. A counterpart, I should say, of your fairy tales."

When the reporters left at the end of three or four hours, the Three Wise Men were headed for the biggest splash of publicity that ever hit anybody. I still remember some of those headlines.

The Three Wise Men Explain Relativity to Einstein

Super-Mentals Baffle Scientists

Future Men Ride Rough Shod Over Earth's Best Minds

There were pictures by the dozens, pictures of the Three, pictures of their machine—what was left of it after the souvenir hunters got through with it.

FUNNY, but there was one big angle that everybody'd overlooked at first. But when it struck, it socked about forty million people all at once. If these little birds had come out of the future, they must know some history that hadn't happened as yet! And you know, Sarge, there's nothing a man wouldn't give to know what's going to break tomorrow or the next day. Think how swell it would be for a guy playing the market! And these Three with their super memories—well, it looked like a natural.

About forty million phone calls, telegrams and letters struck Mawson Manor at the same time. Could the Three Wise Men tell the history of the future? They could and would!

Oliver P. Mawson arranged it. He's a big fat man about six-feet-two, with round red cheeks like a pair of apples, and eyes as bright as two blue marbles —and he's just as hard. Worked his way up from a laborer in an auto plant

to become one of the richest men in the country.

With Mawson pulling the strings, the Three Wise Men were scheduled for a big television broadcast on a world hook-up. That was just a few months before the Presidential election, and the Three crowded the candidates right off the air waves.

As for the broadcast—well, everybody had heard of the Three, had read what they had said, and now they could see them and hear them. And they said plenty. They told of the big yellow war of seventy years from now. They told. . . . But I guess you heard the broadcast. About this New Era business; and this year being the first of the New Era, the beginning of a slow, unbroken march toward genuine civilization. And how they said a man by the name of Doctor Michel Stoner was the one to take the first big step forward. Michel Stoner, the next President of the United States, they said.

Let me tell you, Sarge, that rocked the great American public back on their heels. Who was Doctor Michel Stoner? Nobody'd ever heard of him. Yet the Three said he was going to be the next President!

The papers—you remember, Sarge—played it up big. Michel Stoner, the Man of Destiny! Who was he? Where was he?

So they started hunting for Michel Stoner, M.D. Some reporter found out that about twenty-five years ago he'd practiced medicine in a little Pennsylvania town, and that he'd dropped that to take over a professor's chair in a college so small they didn't even have a paid football team—and that was all. He'd simply disappeared.

The search went on until at last they found him in a little four-room cabin in the Massachusetts hills about a hundred miles from nowhere. Didn't even have a radio. Hadn't seen a newspaper in two months. Nobody around there knew anything about him except that about once every three months or so he drove out of the hills in a dilapidated flivver to buy some gasoline, food and books. The books they remembered most, 'cause there was always a lot of them waiting in the Post Office marked M. Stoner, General Delivery. I think it was through the publishers he was finally located.

Well, if nobody knew anything about him at first, it didn't take them long to find out. Oliver P., himself, drove up there in a platinum plated Rolls and carried him back to Mawson Manor. And of course there was another big world broadcast, with Mawson the master of ceremonies. The Three Wise Men were there with bells on. And Stoner—well, Sarge, if you saw and heard that broadcast, you'll have to admit he made some impression.

I DON'T care if you do have him behind the bars! I told you he's innocent—and I'm here to prove it to you.

I have another clipping . . .

Now wait a minute, Sarge. Just this one. This'll be the last one I'll read. You see, I make scrap books of the things I'm interested in—helps me keep a record. . . . Listen!

WORLD BROADCAST STARTLES VAST AUDIENCE

Dr. Michel Stoner Makes Amazing Impression

WILL RUN FOR OFFICE

New York City, Aug. 22—Dr. Michel Stoner, the recluse from the Massachusetts hills, will be an independent candidate in the forthcoming Presidential election. He revealed that last night, after a world television broadcast in which he proved to be one of the most impressive figures ever to reach the telescreens. Despite his earlier decision to leave politics to others, Dr. Stoner found the American public so overwhelmingly insistent on his running for office, that he felt impelled to yield to their demands.

Dr. Stoner faced an audience burning with curiosity to see the man mentioned by the Three Wise Men as the first President of the New Era. Of average height and rather slender in build, he is at once a figure of quiet power, impressive dignity, and magnetic personality. His head is crowned with a mass of snow white hair. And his voice—never has such a resonant voice borne so much of wisdom on the one hand and beauty of diction on the other. In Dr. Michel Stoner, America has discovered a genius.

For the past twenty years Doctor Stoner has been engaged in the writing of a vol-

uminous and comprehensive work tentatively entitled "Man and the Way of Man." In his manuscript, already more than two million words in length, Doctor Stoner has discussed in full detail the development of Man since the dawn of reason, up to the present, and into the future. If the numerous quotations from his work are an indication, he possesses a rare insight into human behavior and character.

New Era Dawning

"Man," he said, "has reached the threshold of vast new truths. The doors of knowledge are swinging aside. Old thoughts and methods of thinking are passing away, displaced by a newer, more rational consciousness. Long-standing fears, disorders and superstitions are yielding to an imposing array of new knowledge, like a tidal wave sweeping everything before it. And Man rides like foam on its crest!

"A New Era is dawning, a new age when all mankind will be welded into one vast spiritual whole, one tremendous world community in which the term 'war' will have no meaning. Someone with cosmic understanding, someone in whom the world consciousness has awakened into fulness of life, will lead you, but it should be someone wiser far than I—someone whose name I do not know."

Yeah, Sarge, I suppose that is enough. Seems like everybody else thought so, too, for it was only about ten minutes after he left the air that demands started pouring in for him to run for President.

What a howl went up in certain quarters when the Doc started his c a m p a i g n. After all, this guy's speeches were the kind that got practically anything they asked for, and with the Three Wise Men on his side, it looked like a sure thing for the dark horse. The Democrats kicked because they figured they had had the thing in the bag; and the Republicans kicked because they thought—or, at least hoped—that this time they'd be able to upset the mule.

But the howls were only straws in a cyclone. No one paid much attention to the other candidates. A blind man could see that Stoner was slated to go in with the biggest majority in history. What was the use in voting against a man who, future records showed, had been elected? And with the Three for him, and Mawson's millions behind him—well, Sarge, it was some set-up.

I DIDN'T see much of the three little big-shots those days, nor much of Stoner or Mawson, either. They still made the big Long Island mansion their headquarters, but they were too busy to spend much time with a flock of perpetual house guests. I figure they'd have given us our walking papers if it hadn't been for the scientists, but they made company for the Three, and good copy for the tabloids. Anyway, I was in, and enjoying it.

But after awhile my conscience started working. I remembered Joe Wallace, and here I was, swimming and playing tennis with a pair of swell dames, eating so much that I'd put on an average of two pounds a week, and —well, I decided to get busy.

It took about a week for me to get the hang of the place; then one night when I was playing detective I stumbled on something big. There'd been some big doings in Philadelphia—Stoner given the keys to the burg, a big parade, speeches and everything that went with it. They'd come back to Mawson Manor all played out.

I was sliding along one of those big corridors when I heard voices. Mawson's bark, Stoner's smooth, deep baritone, and the flat creaking voices of the Three. And they didn't sound like they were chinning just to pass the time away.

"Get this, Stoner," I heard Mawson say, and his words sort of cut like a knife, "you're not backing out! You couldn't, even if I'd let you. And I'm not letting you, see! There's too much involved in this for things to topple now. So forget it."

"I can't forget it," Stoner said, as solemn as a funeral. "I'm tired of the whole thing. I wish you'd never found me."

Then one of the Three spoke—I think it was Lon.

"We're tired, too." And he certainly sounded tired; like a guy with insomnia, who hadn't slept for months.

"Tired!" Mawson's voice cracked. "Then go to bed—get some sleep. Tomorrow you'll be over this nonsense. I've got enough to worry about without this. Got another threatening let-

[*Turn to Page 98*]

Wake Up, America!

THINGS are happening in the world today and happening fast! The first issue of our newest companion magazine, THRILLING SPY STORIES, tells you in dramatic form what some of those things are. They spell themselves out in one word—ESPIONAGE.

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97

ter today—this one, I think, from the Ernisto mob. The politicians are back of 'em, I'm certain, but I can't prove it. The police—they can't do a damn' thing! And where'd we be if the Three Wise Men were kidnaped!"

I heard a door slam, and I beat it down the hall—fast.

I didn't sleep so well that night. What I'd heard took heavy thinking. Stoner was tired of the whole thing. Tired of what? Of running for President? Or of a big fake? Then I thought of those strange big-headed little men with their young eyes and old voices, and I didn't know what to think. . . . And this talk of kidnaping—there hadn't been even a whisper about it in the papers. Big things were starting to break, and I could only wait.

I dragged through the next two days in a sort of fog, waiting for something to happen. And when I woke up on the morning of the third day, it had happened all right—cracked wide open.

THE THREE WISE MEN KIDNAPED!

The tabloids screamed it in the biggest headlines since the Lindbergh case. The telescreens sort of snapped, or roared it at a wholesale rate. I'd been half expecting it, yet it knocked the wind out of me.

It seemed Doctor Stoner and the Three had been returning late from a trip to the studios. Mawson had been delayed. On a lonely stretch of road they'd run out of gas—how, was a mystery, 'cause the gauge registered "full." Must've been tampered with. The chauffeur had walked back toward the last gas station they'd passed, and when he'd come back, car, Wise Men, and Presidential candidate had disappeared.

BUT you know all that, Sarge, better than I do—and you know how they found Stoner the next day lying in the back of the car as sick as a dog, and the smell of chloroform strong enough to choke an elephant. He told how a big sedan had pulled up and four men with tommy-guns had ordered the Three into their machine, and had doped him. That was all he knew till the cops found him. And the mileage gauge had been smashed . . .

Oh, I know it's all old stuff to you, but I've got to tell this in my own way. I don't want to skip anything important, see?

Well, in Mawson Manor things resembled a first-class madhouse. The big boss tore things wide open. Doctor Stoner was confined to his room, almost prostrated by shock. And then the police came in droves, and sort of suddenlike I got the idea that it was time for Tom Dorion to scram! I was the uninvited guest, and I'd have a tough time talking myself out of this spot if the police caught up with me.

In town, I hung around my room waiting to see what would happen next. There wasn't much—just the delivery of that first ransom note demanding one million dollars for each of the Three. Letters clipped out of newspapers and pasted on a sheet of bond paper by a guy wearing gloves. No fingerprints—no nothing!

You picked up a lot of mobsters that first week, didn't you, Sarge? And you looked for a house guest who had disappeared on the day after the kidnaping, a guy nobody seemed to know much about—only you couldn't find him. And after a little while you found out you hadn't accomplished anything. The papers made it hot for the police commissioner, and he made it hot for everybody under him. You sweated a flock of mobsters—and it didn't mean a thing.

It was about that time that I decided I'd better get busy. Joe Wallace had told me to stick with the Three Wise Men till I'd signed 'em up for his shows, and here I'd let 'em be kidnaped under my very nose. I sort of thought things over and I got a hunch. You see, I couldn't get that little conversation between Mawson, Stoner, and the Three out of my dome. So I hired a flivver and headed for the Massachusetts hills.

That little cabin of Michel Stoner's wasn't the easiest place in the world to find, but I found it. I guess I was

about two blocks from the place when I parked the rattling wreck I was driving and sort of crept up toward the joint. It was a nifty little hideaway.

It took me about a half an hour to cover a couple hundred yards. I didn't figure there was much danger, if my hunch was right. But I couldn't be sure, so I didn't take any chances. If those hardboiled boys with the hair grease and the tommy-guns were mixed up in this—well, it might not be so healthy for Tom Dorion!

But I finally got there and sort of eased my eyes up over a window sill. There they were—the Three Wise Men and nobody else. It took me just about one second to get around to the door. Let me tell you, Sarge, I felt good. This was a break. Here was my chance. If I didn't get their names on some kind of a contract, it wouldn't be my fault.

WHEN I knocked on the door and one of them answered, "Come in," some of the pep went out of me. Honest, Sarge, I never heard anything as—as lifeless as that voice. So flat and dull. Almost like I was hearing the dead talking, if you get what I mean.

There they were, sprawled out across a cot bed, hardly moving. They always were queer-looking birds, but now it seemed like they were centuries old, as though they were shrinking, drying up before my eyes.

"Good morning, gentlemen," I said cheery-like. "Thought I'd stop in an' say hello."

Anders answered, and he didn't even move his head. "We are glad you came. We are so—tired. We have lived beyond our—allotted span. Soon we shall die. And it is not good to die alone."

If you don't think that just about floored me, Sarge, you're crazy. There I was with the best attraction that ever hit the show game, practically in the palm of my hand, and they were dying! For a second I didn't say a word, just stared from one to another. I still remember half seeing the rest of the room—a little stove with an empty frying pan on it, and a coffee percolator; rows and rows of books.

Lon pulled himself up on one elbow. "There can be no mistake," he whispered, and that's all it was, a hoarse whisper. "We know we have but little time in this life. That is why we left. Doctor—Doctor Stoner arranged it—though he did not realize—how it was with us. We would like to see him before—we die."

Ken, the third little man, sat up, and I could see it took a terrific effort. His eyes burned out at me like two hot coals out of two hollow pits; coals that were burning to ashes.

"We are old—so terribly old," he croaked, "yet we are so—young. And the end is close." A thin hand pointed toward the desk. "There, in the upper drawer on that side, is a little book. Get it."

In a sort of trance I went over to the desk, I found the book.

"That explains things—which should be known." And Ken slumped back on the bed.

"Look," I said, "isn't there something I can do?" My thoughts were going around in circles, but I felt I had to do something.

Ander moved his head from side to side. "No one can help us. We know. But you can get Doctor Stoner to—come here—before we pass on. There may be time—if he hurries."

I sort of slid toward the door. "Okay, okay, I'll rush," I said. "I'll get him. Just hang on."

The next thing I knew, I was hot-footing it up the winding road toward the flivver. And, let me tell you, I sent that old can rolling like she never rolled before. I'd passed through a little town about fifteen miles back, and I headed that way with the accelerator jammed against the floor-board.

I guess I reached the place in about twenty minutes, though it seemed like hours. But I got there, finally, and I put in a long distance call for the Mawson estate. A cop answered, I think. It didn't take him long to get Doc Stoner on the wire when I bellowed it was a matter of life or death.

I SPILLED the story to Stoner in a few words, but he didn't even let

me finish. I heard a sort of choking cry, then I heard the receiver crash on the hook. I got out of there in a hurry. I didn't want to be around when the fireworks started.

You know what happened better than I do. Stoner tearing out of the mansion like a lunatic, grabbing that big Rolls Royce of Mawson's and roaring away before anyone could even think of stopping him.

Nobody but Stoner knows what happened up to the time the cops arrived, about an hour behind him. I have a good idea, but it's only an idea. Anyway, when the police got there, as you know, Sarge, they found the Doctor sitting on a stump in the weed-grown garden behind the cabin. And the cabin—it was half burned down by that time. A little later there were only smoking ashes.

And Doctor Stoner just sat there and stared. And he'd only say in a sort of dull, dry voice:

"They're dead, and that's their funeral pyre. No one will ever know."

But he didn't kill 'em, Sarge. I tell you, he's innocent. They just died!

Here's how I dope it out, Sarge. Oliver P. Mawson was behind the whole thing. You ought to be able to see that yourself with my telling you about that argument I heard. He got the big idea when he stumbled across Stoner's cabin while driving through the hills up there. Those three little guys with their big heads must have started his imagination working.

Huh? Sure, they were there all the time. Don't tell me you fell for that time-traveling bunk! Mawson staged the whole thing. I'll bet when you check on it, you'll find he had the "time-machine" built in his automobile factories. And, of course, since he couldn't very well fake a time-traveling engine, he had to have that explosion to destroy it. It was good publicity stuff, too. Made a swell spectacle, with a little chemical of some sort spilled on the ground.

It was power he wanted! Power! He had so much money he couldn't keep track of it, and that could buy quite a bit of power—but not enough. He'd been a little guy who had worked himself up from nowhere, and it had gone to his head. He wanted to be dictator of America—and he almost got what he was after!

Sure! With these fake men from the future, he planned to have Stoner elected to the Presidency, with himself, of course, the power behind the throne. And a little later on, with those same Three Wise Men paving the way, he'd take over the control of the government. It was a perfect setup; only something bigger than Oliver P. stepped in.

Where'd the Three come from? *That's where that little black book* comes in—my ace in the hole. That's what will save Michel Stoner from the chair or the bug-house. I've got it here. It's Stoner's diary, with a daily record covering the last twenty years.

Of course I'll give it to you, Sarge—but you can't read shorthand, can you? I can. Listen to this—the first entry that interests us, years back:

March 3, 1930. Ann is dead. It was too much for her. God forgive me, but I did all a man could do. She was always so frail, and those endless hours of travail were more than she could bear. What will I do? I can hardly see the page before me. And those three mites, they're such pitiful little things. Their heads are enormous. Victims of hydrocephalus, obviously. I must save them—or her death will be completely futile.

I'VE looked up that word "hydrocephalus," Sarge. It means water on the brain. Here's what a guy named Blakeslee says about it. A lot of it's Greek to me, but you'll get the general idea.

"Hydrocephalus. Fluid effusion within the cranium, giving rise to a more or less uniform stretching of the cranial bones. The sutures are obviously stretched asunder, accompanied by extreme enlargement of the forehead. Frequently the eyes will appear misplaced. Sometimes they look very much deeper set than normal; in other cases they look as though they are depressed, as a result of the downward pressure exerted by the excess fluid upon the roof of the orbits. Major degrees of hydrocephalus cause such extreme enlargement of the head, coupled with such thinning of the bones and stretching of the sutures, that the diagnosis is almost unmistakable . . .

Here's the next important entry.

The three boys are still alive, though that they can live at all with such inadequate treatment is a miracle. I have only canned milk and a prepared baby food, and it's a poor substitute for mother's milk. I buried Ann out in the garden beside the stump where she liked to sit. There was nothing else to do. I can't leave my three sons while life remains in their little bodies. I've decided to try the glandular treatment advocated by Gardner for the hydrocephalic condition.

There's no use reading the entries for the next few weeks, Sarge. It's touch and go for the three boys. But here's the entry for April 22nd:

The danger for Andrew, Alonzo and Kenneth is past. They seem almost normal now, though they'll always have abnormally large heads. I hope their minds are not affected, a definite possibility, since theirs was such a severe case. I left them alone for the first time today while I drove into town for some much needed supplies.

It goes on that way, Sarge, for about seven years. Then you begin to see Doc Stoner starting to get sort of worried. Something's wrong with his boys. Finally he writes this:

May 19, 1937. Lord, what a blunder! I'm a disgrace to the medical profession. To think that this could have happened to my own sons! I've noticed a strangeness for quite some time past, and at last I know what it is. Progeria. A glandular ailment so obscure that perhaps only a half dozen cases have been recorded. The indications are almost unmistakable. I'm afraid—no, certain—that this condition is the result of my treatment for the hydrocephalus. I know now that my boys will never be normal, at least physically. Mentally they seem far above average. Andrew is the most brilliant, though all three have truly amazing memories. Already they have read and memorized every book in my library. I'll have to buy more books. Perhaps they may develop into brilliant scientists or writers.

I looked that word "progeria" up, too, Sarge, and what a time I had. Here's the little information I got:

"Progeria is primary, spontaneous infantilism mingled with premature senility. Hence, with shortness of stature and other indications of infantilism, there are baldness, emaciation, arterial sclerosis, and general decrepitude. The ear lobule is absent, the nasal cartilages are conspicuous, and the fingers nodose owing to the prominence of the epiphyses. Death from angina pectoris or other senile disease usually ensues at eighteen or earlier."

There's a lot there that I don't understand, Sarge, but I do know this. The Three Wise Men were freaks built up by those two diseases. They looked like men from the future—or, at least, like some writers say they'll look. Mawson saw their possibilities, talked Stoner into showing them off—after all, Stoner was probably proud of their brains—and got the doctor to go into the thing himself. When he saw what it was leading to, he tried to back out, but Mawson wouldn't let him. He faked the kidnaping to upset Mawson's plans.

The three boys, old men at eighteen, died of old age. And Stoner, all broken up because his sons were dead, and probably blaming himself, burned their bodies with the cabin, to let them keep the little glory that was theirs.

I've spoiled that by telling you this, but anyway, I've saved him from the chair.

Here's the diary, Sarge. There's a lot more dope in it. I guess I'd better report back to Joe Wallace.

Thrills in SCIENCE

Thumbnail Sketches of Great Men and Achievements

By MORT WEISINGER

THE WORLD MOVES ON

THE vast, soundproof room was as silent as a vault. Its main piece of furniture was a long, oaken table. On it a pair of slender, crooked candles flickered eerily, casting weird shadows on the walls.

Around the table sat six masked men. Behind the black masks a dozen gleaming eyes blazed angrily. The six pairs of eyes had a common human target—the nervous, bearded astronomer standing before them.

The seventh man, Galileo de Galilei, stared apprehensively into the tapering flame of one of the candles. As the blue-white tongue licked and writhed in a dance of light, the bearded astronomer seemed to see an image form there. A tall, defiant figure resolved itself into view. It was a human being, lashed to the stake. His captors, thin-lipped, cruel, stood by impassively, heaping fuel to the fire. Savagely the roaring flames enveloped their victim in a fiery shroud . . . and soon the corpse was as charred as the wooden stake to which it had been fettered.

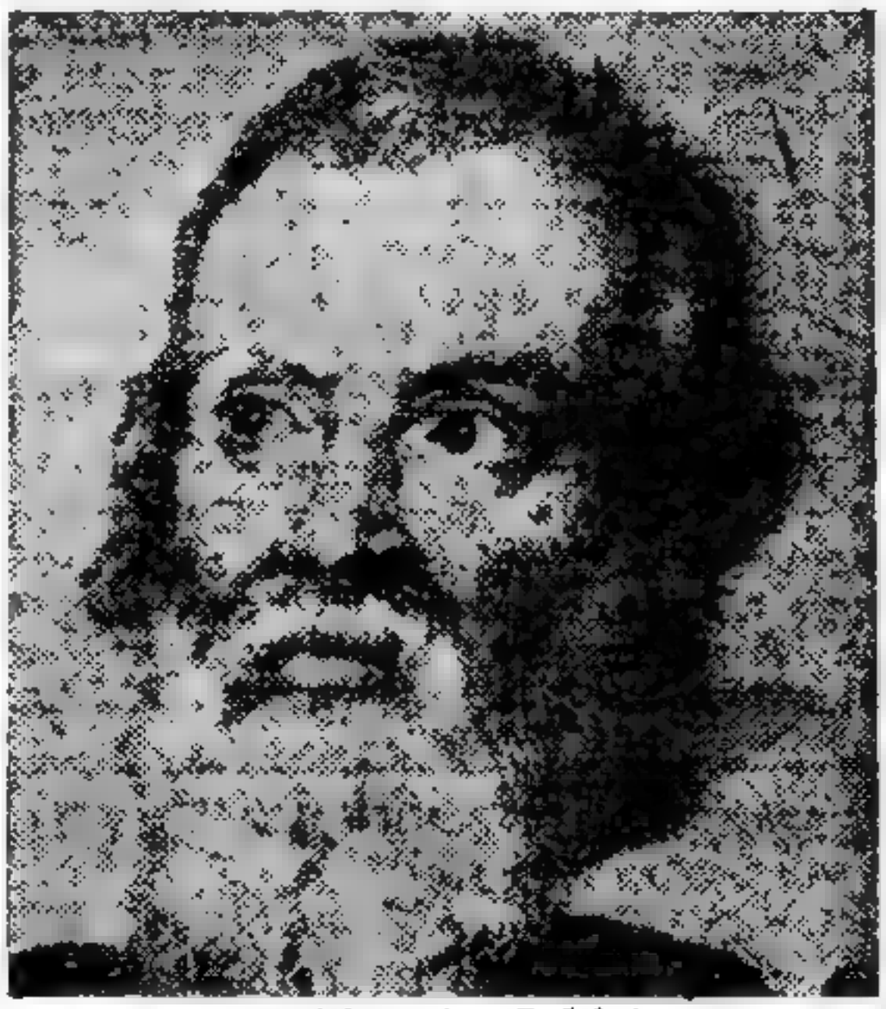
Galileo mopped his feverish brow and stared hopelessly about the great room as he strove to forget the vivid picture recalled to his mind. So they had burned Giordane Bruno, an astronomer before him, at the stake. For Bruno had dared to teach the heretic theory that the Earth is not immovably fixed in the center of the Universe, that the Earth was not the big shot of the Solar System. That belief was contrary to the teachings of science. And, most important, it refuted the Bible. So the law had decreed that Bruno, the free-thinker, must burn.

Galileo's eyes shifted pleadingly over the faces of the masked men surrounding the table. He encountered only blank, stony stares. Still not a word had been uttered by anyone.

Galileo bit his lip. If they had burned Bruno at the stake for daring to tell the truth . . . such a little bit of the truth . . . what would happen to him? His discoveries revolutionized all existing concepts of astronomy. They proved to the world that the Universe was vast, cluttered with countless stars and planets and satellites. And the Earth was merely a cosmic drop in the bucket. Man—man was nothing—as unimportant as a grain of sand in the ocean's bed. And if man was nothing—what was the power of the Church? That was why they would destroy him.

Galileo shifted the weight of his body from one foot to the other. Would that he had never constructed his telescope, explored the mysteries of the heavens, studied the revolutions of the neighboring planets.

Most certainly, Galileo would unhesitatingly have given up his life rather than have



Galileo de Galilei

foregone the thrills his magic optical tube had captured for him. The thrill of being the first man to discover sun spots . . . the first man to see Saturn's Rings . . . Jupiter's four largest satellites. . . .

But Galileo lived in the dreaded and dark days of the Inquisition. Sweet, merciful death he could face swiftly, even eagerly. He could die for his principles. But how many men can brave the ghastly unknown? The insidious, diabolical tortures of a group

of fanatics, expert in wrenching from a human body its most inner secret, its last audible breath. Galileo had seen some of the poor, miserable wretches that had survived the torturers' arts. Not a pretty sight. And now he himself stood before the leaders of the Inquisition, awaiting judgment.

"Galileo de Galilei," the chief counsellor addressed him, "we have examined your books minutely. We have been deeply shocked by the falsehoods contained therein, and we have come to the conclusion that your teachings are vicious blasphemies, entirely unsupported by scientific findings!"

The masked counsellor paused for a moment, the better to let his dramatic accusation seep into the fogged brain of his defendant . . . the defendant who didn't have a chance.

"Falsehoods?" Galileo roared back at his accuser. "Unsupported findings? I have stated that the world revolves about the sun on its own axis—just as I have seen is the case with the satellites circling Jupiter. The sun does not circle the Earth every twenty-four hours. Such an immense orbit is absurd!"

"Silence!" thundered the voice of the leader. "You lie. And unless you confess your errors and renounce your writings for all the world to know—" He gestured meaningly in the direction of the adjacent room—the torture chamber.

Galileo shuddered. Then he sucked in his breath, clenched his fists. He'd tell them—

The chief counsellor leaned forward, divining Galileo's forthcoming outburst.

"Think, Galileo de Galilei," he warned. "Not the stake—not the ax—but the torturers. . . . Swear by God that your teachings are false, that the Earth does not move about the sun, and you will go free!"

Galileo buried his face in his hands. He was trapped. Slowly, hoarsely, he began his denial of a lifetime's work. Staring wrathfully at his Inquisitors, he told them:

"I swear that all my teachings are false . . . I beg foregiveness for having deceived my fellow men . . . The Earth does not move about the sun. . . ."

A cold, superior smile illumined the gaunt features of the masked men's leader.

"You are forgiven, Galileo," he said. "And heed well that you do not blaspheme again."

Galileo stifled an oath, half-pivoted about and faced the wall.

"EPPUR SI MOUVE"—"None the less, the planet moves," he muttered almost inaudibly, his face livid with rage. And then the astronomer bowed mockingly to his audience and walked into the clean air outside.

Had they heard him? If they had, then he had won. If they hadn't, he'd lost. But win or lose, Galileo knew that future civilization would reach a verdict in his favor. For the world moves—on!

LABORATORY LIFE

THE olive-skinned Luigi Galvani pointed an acid-stained finger at the metal tray on his laboratory desk. A dead, dissected frog lay there, its ventral surface neatly split open, all the vital organs exposed to view.

Professor Galvani lifted a scalpel from the machine to his left, tapped it against the wooden desk, and addressed his dark-haired companion.

"Now watch closely, Signor Volta," he said confidently. "I will repeat the experiment you have read about. I know it sounds incredible. But you will soon see for yourself!"

"Wait one moment," interrupted Alessandro Volta. He lifted the tray gingerly, carefully inspected the base. Nothing suspicious there. There was no need to examine the frog. It was as dead as the lamb they had had for dinner.

Volta shook his head at his smiling Italian colleague. "All right, go ahead," he grumbled at last. "Begin your experiment."

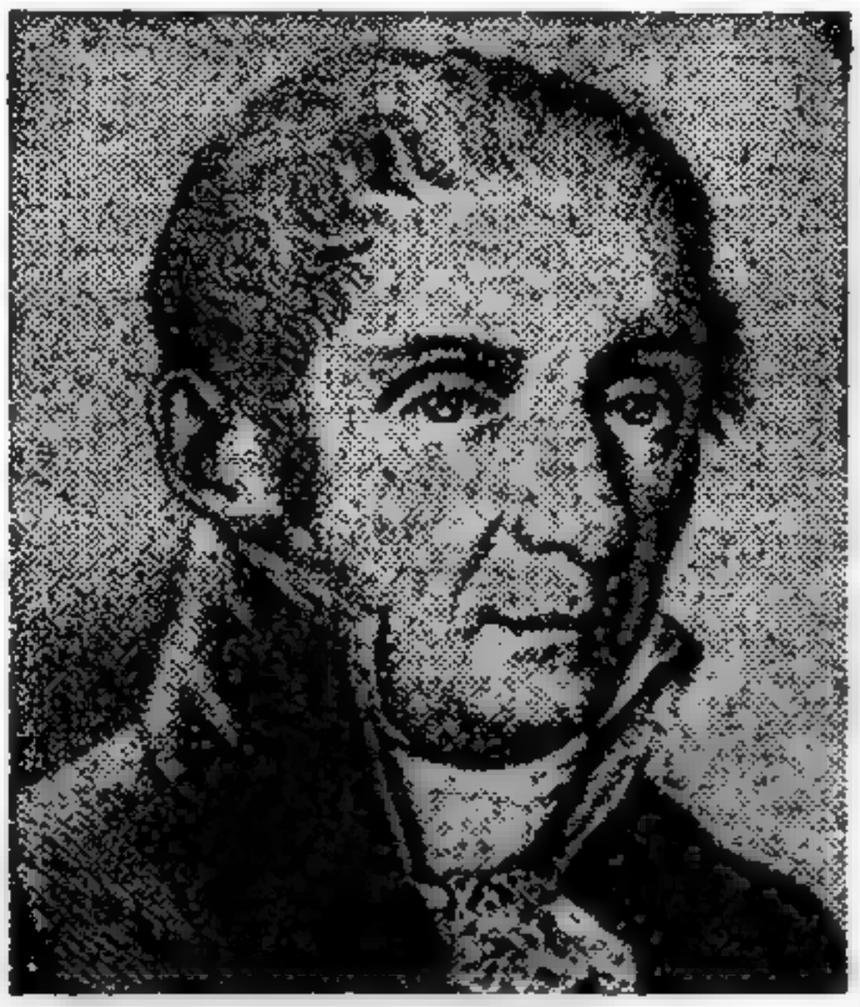
Silently, Professor Galvani waved his scalpel before his curious associate. Then he brought its shining, sharp point in contact with one of the strandlike nerves in the frog's left leg.

Instantly, the lifeless frog's leg kicked out, twitched convulsively. The leg had moved perceptibly, although the frog had been dead for days!

Alessandro Volta's eyes bulged at the phenomenon, as though the same scalpel had physically stimulated him too. He shook his head, totally perplexed.

"Do it with the other leg, please," he said incredulously.

Again the blade swooped down to inter-sect a fibrous filament of nerve. This time the right leg of the frog stabbed out in a



Alessandro Volta

healthy, violent kick. It was uncanny.

"I can't understand it," Volta muttered. "Pray, Professor, how do you explain this?"

Professor Galvani smiled wisely, put back the scalpel on the machine on his left, put an arm about his friend's shoulder.

"It's simple, Alessandro," he explained. "Electricity exists in the tissues of the dead frog. My scalpel merely touches off that stored electricity, releases it in the form of energy in the frog's body. The electricity goes through the nerves of the frog's legs, results in a reflex action—a kick."

"In other words, you believe that the body of a dead frog contains electricity?"

"*Si*, my friend. That is it, exactly. All animals carry electricity."

"Do you know what I think?" Volta asked rhetorically. "I think your theory is preposterous. Electricity can only be produced by the contact of two different metals. That is a fact of which I am certain. You cannot convince me otherwise."

Professor Galvani smiled amusedly.

"Then how do you explain what you have just seen? That was no trick. And I assure you that the frog was one pretty dead fellow!"

Volta shrugged his wide shoulders.

"That I cannot answer, my friend," he said good-naturedly. "But I'll discover the answer—just as sure as this is the year 1800!"

Alessandro Volta left his friend's house, a deep problem haunting his energetic mind. The evidence he had seen for himself was no optical illusion. Certainly there was no supernatural explanation. There must be some good scientific reason to explain why a cold, dead frog should be able to kick vigorously.

Galvani's explanation he immediately discarded. Galvani was an anatomy professor who had only recently begun to dabble with electricity. And Volta knew from his many personal experiences that his associate's theory was much too far-fetched.

What then was the answer? He was baffled. It remained a mystery.

The weeks sped by . . . became months. But Volta had not forgotten.

Then, one day in his own laboratory, Volta suddenly realized the solution. The answer to the problem that had been plaguing him was simple. So simple it had eluded everyone's notice, even Galvani's.

The answer was this: In recalling the details of Galvani's experiment to mind, a scene he could never forget, Volta remembered that the professor had picked up the scalpel used to contact the frog's nerves from its lodging place—a machine!

That was the one smashing clue Volta needed to shatter Galvani's theory into limbo. If his deductions were right, then Galvani was wrong by a light-year. But first he would have to find out more about this machine. . . .

Back in Galvani's laboratory, Volta beckoned his amazed friend to his desk. He pointed to the machine standing beside it.

"What kind of machine is this, Professor Galvani?" he asked, his deep black eyes sparkling.

"Why, it's an electrical machine. I've been using it to make static electricity. Why do you ask?"

"Ah!" Volta exclaimed. "So I am right! Your scalpel rests on this machine. Obviously, the scalpel is electrified with some of the electricity stored in the machine. It is this electricity, transferred to the scalpel, that activates the frog's legs—not the release of 'electricity' in the frog's body! You've never realized this truth, my friend!"

Galvani frowned, started to protest.

"Wait, let us touch your frog with MY scalpel!" suggested Volta. And before the bewildered Galvani could protest, Volta had raced over to a jar, extracted a dead frog, split it in two, and applied his scalpel. There was no reaction. Volta had proved his rejection of Galvani's theory.

Inspired and thrilled by his analytical abilities, Volta used his discovery as the basis toward proving his own theory—that electricity is produced by metals. By connecting a series of two different metal discs, copper and zinc, separated by a piece of cloth soaked in sulphuric acid and water, he obtained a weak electric current—the first man ever to accomplish that feat in such a manner.

Next Volta joined a larger series of these metals and obtained a stronger flow of electricity. Volta had invented what was to be known as the "voltaic pile," forerunner of the modern storage battery! And all the result of a pair of twitching frog's legs! A pair of legs that will be remembered as long as the "volt" remains a key term in modern electricity.

RACING AGAINST LIGHT!

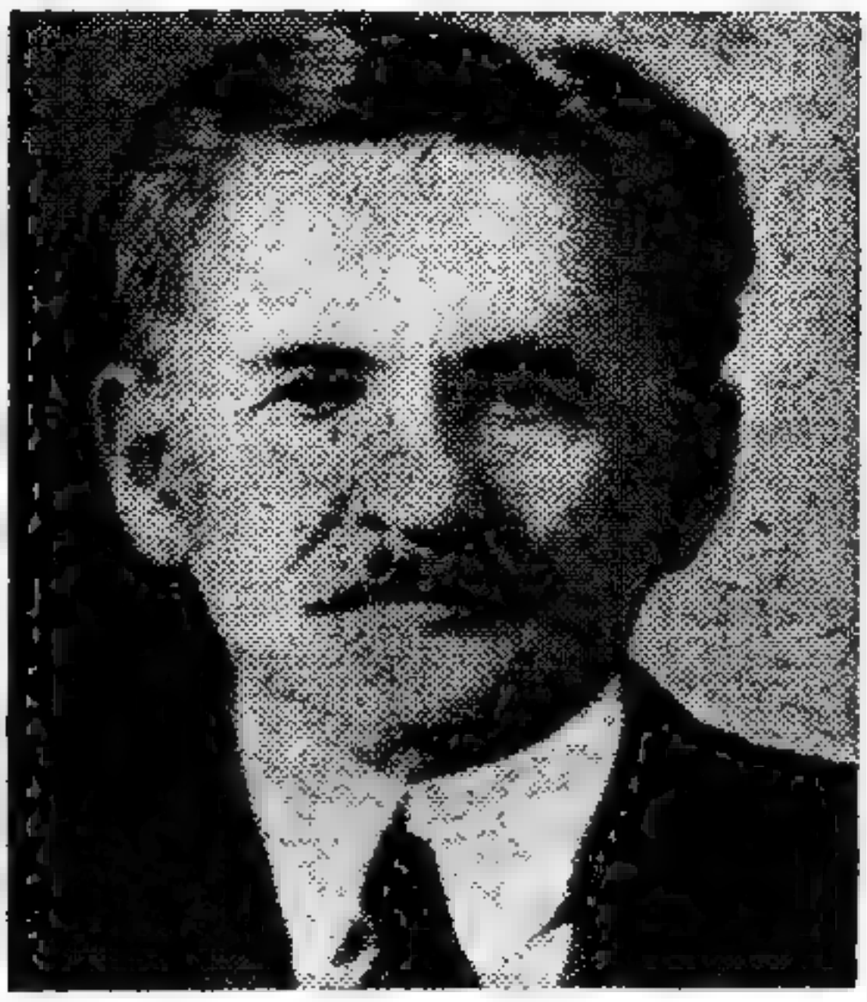
PROFESSOR ALBERT ABRAHAM MICHELSON tried to be calm, but instead he trembled. How could one be calm and cool when the most delicate experiment in the annals of science was about to be attempted?

The year was 1887. Several years before, Michelson had startled the scientific world by measuring the velocity of light, the fastest element in the universe, to an inconceivably accurate degree. He had shuttled a beam of light back and forth between two mountain tops in California, measuring its speed with a sensitive instrument, the interferometer, his own invention.

But that had been child's play compared to what he now attempted. He was trying to detect the infinitesimal influence on the velocity of light caused by the Earth's motion through free space. Hendrik Lorentz, the famous European physicist, had calculated theoretically that this would be no more than 0.00001 of the actual light-speed! And Michelson had declared that he could

measure that effect with his instruments, verifying Lorentz's calculations.

Michelson was crazy! His task was impossible! That was the opinion of the European men of science. True, Michelson had won their respect by his ingenious method of clocking the speed of light. But now he was making a fool of himself. He had overestimated his mechanical technique, as those



Albert Abraham Michelson

Americans were so prone to do. He was trying to play God and command light to stand still for him, as Joshua, a leader of Michelson's own race, had commanded the sun to halt, an age before.

"You must be more calm, Professor!" admonished Morley, his assistant. "Why, you're shaking all over!"

Michelson nodded grimly, controlling himself. By nature he was genial, smiling, but now he was a tense bundle of nerves. The experiment was started. A powerful light beam was sent through a series of mirrors mounted on a stone platform floating in a bath of oily liquid mercury.

A turntable operated by a powerful compressed-air motor periodically swung the entire apparatus at right angles, easily, effortlessly. Michelson had spent mind-draining months designing the various parts with a precision unknown before in the history of physics.

Finally the moment arrived and Michelson's taut fingers adjusted the eyepiece of the interferometer. Twin beams of light from the mirrors speared into the instrument. One went in the direction of Earth's orbital motion. The other went transversely to that motion. The latter, going ACROSS the ether through which Earth drifted, should lag a little from the one following the ether. And his interferometer would then show the difference, by the interference of bands of light and dark.

Michelson's reputation balanced precariously on the results his instrument would record. All the scientific world waited, many with derisive smiles, to see whether the brash American could accomplish what the Europeans had not even tried—because it was impossible. Michelson's soul, as well as his eyes, probed the interferometer that day. And he saw—

Nothing!

Not the slightest interference! He tried again, checking every motion, every screw, bolt and mirror. Apparently, the apparatus

(Concluded on page 128)

"I TALKED WITH GOD"

(yes, I did—actually and literally)

and as a result of that little talk with God a strange Power came into my life. After 42 years of horrible, dismal, sickening failure, everything took on a brighter hue. It's fascinating to talk with God, and it can be done very easily once you learn the secret. And when you do—well—there will come into your life the same dynamic Power which came into mine. The shackles of defeat which bound me for years went a-shimmering—and now—?—well, I own control of the largest daily newspaper in our County, I own the largest office building in our City, I drive a beautiful Cadillac limousine, I own my own home which has a lovely pipe-organ in it, and my family are abundantly provided for after I'm gone. And all this has been made possible because one day, ten years ago, I actually and literally talked with God.

You, too, may experience that strange mystical Power which comes from talking with God, and when you do, if there is poverty, unrest, unhappiness, or ill-health in your life, well—this same God-Power is able to do for you what it did for me. No matter how useless or helpless your life seems to be—all this can be changed. For this is not a human Power I'm talking about—it's a God-Power. And there can be no limitations to the God-Power, can there? Of course not. You probably would like to know how you, too, may talk with God, so that this same Power which brought me these good things might come into your life, too. Well—just write a letter or a post-card to Dr. Frank B. Robinson, Dept. 711-11, Moscow, Idaho, and full particulars of this strange Teaching will be sent to you free of charge. But write now—while you are in the mood. It only costs one cent to find out, and this might easily be the most profitable one cent you have ever spent. It may sound unbelievable—but it's true, or I wouldn't tell you it was.—Advt. Copyright, 1939, Frank B. Robinson.

THE FIRST STORY EVER WRITTEN

A MARTIAN ODYSSEY

By STANLEY G. WEINBAUM

Author of "The Black Flame," "Dawn of Flame," etc.

DICK JARVIS stretched himself as luxuriously as he could in the cramped general quarters of the Ares.

"Air you can breathe!" he exulted. "It feels as thick as soup after the thin stuff out there!" He nodded at the Martian landscape stretching flat and desolate in the light of the nearer moon, beyond the glass of the port.

The other three stared at him sympathetically—Schatz, the engineer, Leroy, the biologist, and Harrison, the astronomer and captain of the expedition.

Dick Jarvis was chemist of the famous crew, the Ares expedition, first human beings to set foot on the mysterious neighbor of the Earth, the planet Mars. This, of course, was in the old days, less than twenty years after the mad American, Doheny, perfected the atomic blast at the cost of his life, and only a decade after the equally mad Cardoza rode on it to the moon.

They were true pioneers, these four of the Ares. Except for a half-dozen moon expeditions and the ill-fated de Lancey flight aimed at the seductive orb of Venus, they were the first men to feel other gravity than Earth's, and certainly the first successful crew to leave the Earth-moon system. And they deserved that success when one considers the difficulties and discomforts—the months spent in acclimatization chambers back on Earth, learning to breathe air as tenuous as that of Mars, the challenging of the void in the tiny rocket driven by the cranky reaction motors of the twenty-first century, and mostly the facing of an absolutely unknown world.

Jarvis stretched again and fingered the raw and peeling tip of his frost-bitten nose. He sighed again contentedly.

"Well," exploded Harrison abruptly, "are we going to hear what happened? You set out all shipshape in an auxiliary rocket, we don't get a peep for ten days, and finally Schatz here picks you out of a lunatic ant-heap with a freak ostrich as your pal. Spill it, man!"

"'Speel'?" queried Leroy perplexedly. "Speel what?"

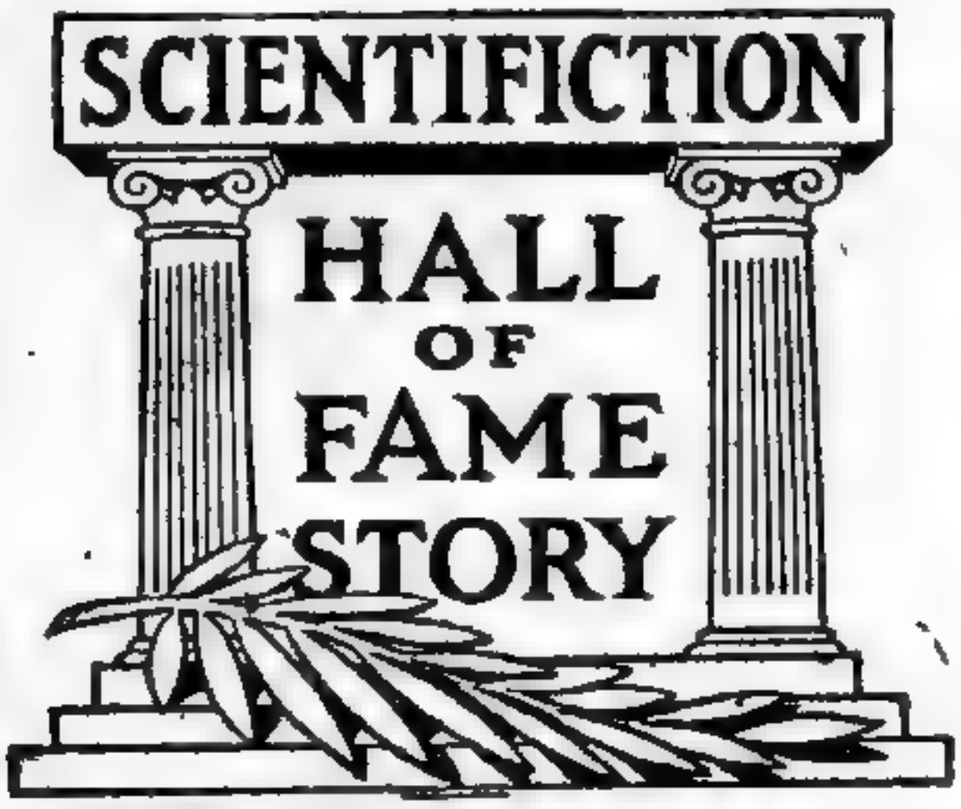
"He means 'spiel'," explained Schatz soberly. "It iss to tell."

Jarvis met Harrison's amused glance without the shadow of a smile.

"That's right, Karl," he said in grave agreement with Schatz. *"Ich spiel es!"* He grunted comfortably and began.

"According to orders," he said, "I watched Karl here take off toward the North, and then I got into my flying sweat-box, and headed South. I set the two cameras clicking and buzzed along, riding pretty high, calling back my position every hour, and not knowing whether you heard me."

"I did," snapped Harrison.



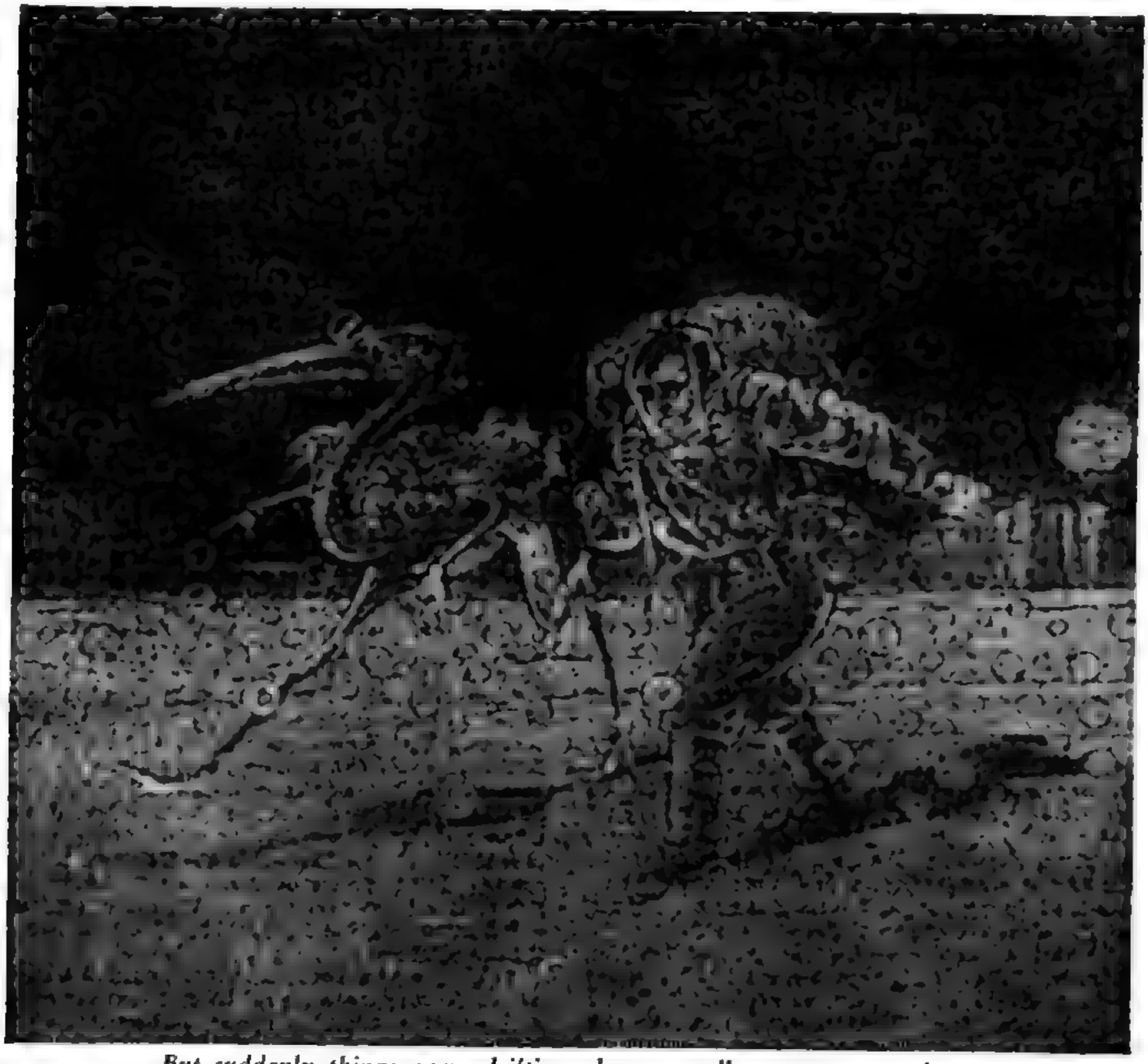
EDITOR'S NOTE: Some stories are forgotten almost as soon as they are printed. Others stand the test of time.

Because "A Martian Odyssey," by Stanley G. Weinbaum, has stood this test, we are nominating it for SCIENTIFICTION'S HALL OF FAME.

In each issue we will nominate—and reprint—another favorite of the past.

Will you vote for your favorite? Write and tell us what it is.

We hope in this way to bring a new prominence to the science fiction gems of yesterday and to perform a real service for the science fiction devotees of today and tomorrow.



But suddenly things came drifting along—small, transparent spheres

"A HUNDRED and fifty miles south," continued Jarvis imperturbably, "the surface changed to a sort of low plateau, nothing but desert and orange-tinted sand. I figured that we were right in our guess, then, and this gray plain we dropped on was really the Mare Cimmerium which would make my orange desert the region called Xanthus. If I were right, I ought to hit another gray plain, the Mare Chronium, in another couple of hundred miles, and then another orange desert, Thyle I or II. And so I did."

"Schatz verified our position a week and a half ago!" grumbled the captain. "Let's get to the point."

"Coming!" remarked Jarvis. "Twenty miles into Thyle—believe it or not—I crossed a canal!"

"Schatz photographed a hundred! Let's hear something new!"

"And did he also see a city?"

"Twenty of 'em, if you call those heaps of mud, cities!"

"Well," observed Jarvis, "from here on I'll be telling a few things Schatz didn't see!" He rubbed his tingling nose, and continued. "I knew that I had sixteen hours of daylight at this season, so eight hours—eight hundred miles—from here, I decided to turn back. I was still over Thyle, whether I or II I'm not sure, not more than twenty-five miles into it. And right there, Schatz's pet motor quit!"

"Qvit? How?" Schatz was solicitous.

"The atomatic blast got weak. I started losing altitude right away, and suddenly there I was with a thump right in the middle of Thyle! Smashed my nose on the window, too!" He rubbed the injured member ruefully.

"Did you maybe try vashing der combustion chamber mit acid sulphuric?" inquired Schatz. "Sometimes der lead giffs a secondary reaction—"

"Naw!" said Jarvis disgustedly. "I wouldn't try that, of course—not more than ten times! Besides, the bump flattened the landing gear and busted off the under-jets." He rubbed his nose again. "Lucky for me a pound only weighs seven ounces here, or I'd have been mashed flat!"

"I could have fixed!" ejaculated the engineer. "I bet it vas not serious."

"Probably not," agreed Jarvis sarcastically. "Only it wouldn't fly. Anyway, I rigged up a harness from some seat straps, and put the water tank on my back, took a cartridge belt and revolver, and some iron rations, and started out on shank's mare."

"Water tank!" exclaimed the little biologist, Leroy. "She weigh one-quarter ton!"

"Wasn't full. Weighed about two hundred and fifty pounds Earth-weight, which is eighty-five here. Of course, I took a thermoskin sleeping bag for these wintry Martian nights."

"Off I went, bouncing along pretty quickly. Eight hours of daylight meant twenty miles or more. It got tiresome, of course—plugging along over a soft sand desert with nothing to see, not even Leroy's crawling biopods. But an hour or so brought me to the canal—just a dry ditch about four hundred feet wide, and straight as a railroad on its own company map.

"There'd been water in it sometime, though. The ditch was covered with what looked like a nice green lawn. Only, as I approached, the lawn moved out of my way!"

"EH?" said Leroy.

"Yeah; it was a relative of your biopods. I caught one—a little grasslike blade about as long as my finger, with two thin, stemmy legs."

"He is where?" Leroy was eager.

"He is let go! I had to move, so I plowed along with the walking grass opening in front and closing behind.

"It was just before twilight that I reached the edge of Thyle, and looked down over the gray Mare Chronium. And I knew there was seventy-five miles of that to be walked over, and then a couple of hundred miles of that Xanthus desert, and about as much more Mare Cimmerium. Was I pleased? I cussed you fellows for not picking me up!"

"We were trying, you sap!" said Harrison.

"That didn't help. Well, I figured I might as well use what was left of daylight in getting down the cliff that bounded Thyle. Up to that time, you know, I hadn't seen anything worth worrying about on this half-dead world—nothing dangerous, that is."

"Did you?" queried Harrison.

"Did I! You'll hear about it when I come to it. Well, I was just about to turn in when suddenly I heard the wildest sort of shenanigans!"

"Vot iss shenanigans?" inquired Schatz.

"He say, *'Je ne sais quoi,'* explained Leroy. "It is to say, 'I don't know what.'"

"That's right," agreed Jarvis. "I didn't know what, so I sneaked over to find out. There was a racket like a flock of crows eating a bunch of canaries—whistles, cackles, caws, trills, and what have you. I rounded a clump of stumps, and there was Tweel!"

"Tweel?" said Harrison, and "Tweel?" said Leroy and Schatz.

"That freak ostrich," explained the narrator. "At least, Tweel is as near as I can pronounce it without sputtering. He called it something like 'Trrrweerrlll'."

"What was he doing?" asked the captain.

"He was being eaten! And squealing, of course, as any one would."

"Eaten! By what?"

"I found out later. All I could see then was a bunch of black ropy arms tangled around what looked like, as Schatz described it to you, an ostrich. I wasn't going to interfere, naturally; if both creatures were dangerous, I'd have one less to worry about.

"But the bird-like thing was putting up a good battle, dealing vicious blows with an eighteen-inch beak, between screeches. And besides, I caught a glimpse or two of what was on the end of those arms!" Jarvis shuddered. "But the clincher was when I noticed a little black bag or case hung about the neck of the bird-thing! It was intelligent! That, or tame, I assumed. Anyway, it clinched my decision. I pulled out my automatic and fired into what I could see of its antagonist.

"There was a flurry of tentacles and a spurt of black corruption, and then the thing, with a disgusting sucking noise, pulled itself and its arms into a hole in the ground. The other let out a series of clacks, staggered around on legs about as thick as golf sticks, and turned suddenly to face me. I held my weapon ready, and the two of us stared at each other.

"The Martian wasn't a bird, really. It wasn't even birdlike, except just at first glance. It had a beak all right, and a few feathery appendages, but the beak wasn't really a beak. It was somewhat flexible; I could see the tip bend slowly from side to side; it was almost like a cross between a beak and a trunk. It had four-toed feet, and four-fingered things—hands, you have to call them, and a little roundish body, and a long neck ending in a tiny head—and that beak. It stood an inch or so taller than I, and—well, Schatz saw it!"

The engineer nodded. "Yah! I saw!"

Jarvis continued. "So—we stared at each other. Finally the creature went into a series of clackings and twitterings and held out its hands toward me, empty. I took that as a

gesture of friendship."

"Perhaps," suggested Harrison, "it looked at that nose of yours and thought you were its brother!"

"Huh! You can be funny without talking! Anyway, I put up my gun and said, 'Aw, don't mention it,' or something of the sort, and the thing came over and we were pals.

"BY that time, the sun was pretty low and I knew I'd better build a fire. I started breaking off chunks of this desiccated Martian vegetation, and my companion caught the idea and brought in an armful. I reached for a match, but the Martian fished into his pouch and brought out something that looked like a glowing coal; one touch of it, and the fire was blazing—and you all know what a job we have starting a fire in this atmosphere!

"We just couldn't connect! I tried 'rock,' and I tried 'star,' and 'tree,' and 'fire,' and Lord knows what else, and try as I would, I couldn't get a single word! Nothing was the same for two successive minutes, and if that's a language, I'm an alchemist! Finally I gave it up and called him Tweel, and that seemed to do.

"But Tweel hung on to some of my words. He remembered a couple of them, which I suppose is a great achievement if you're used to a language you have to make up as you go along. But I couldn't get the hang of his talk; either I missed some subtle point or we just didn't think alike—and I rather believe the latter view.

"After a while I gave up the language business, and tried mathematics. I scratched two plus two equals four on the ground, and demonstrated it with pebbles. Again

A Pioneer of Scientifiction

HERE'S the story that revolutionized scientifiction! Prior to the publication of Stanley G. Weinbaum's first story, A MARTIAN ODYSSEY, all the interplanetary stories were ruled by one dominant concept—that future explorers will step into another world and find conditions there similar to those on Earth. Authors usually pictured alien human beings with two feet and two legs, two eyes, etc., just as is the case on Earth, although the chances are not one in a million that such conditions will prevail.

Stanley G. Weinbaum, fully conscious of this thought, smashed these precepts in his first tale. He presented his own startling array of interplanetary life-forms—strange organisms evolved by strange environments.

A MARTIAN ODYSSEY is more than a great story. It is the forerunner of stories to come and it will be forever identified with the memory of Stanley G. Weinbaum.

Stanley G. Weinbaum

"And that bag of his!" continued the narrator. "That was a manufactured article, my friends; press an end and she popped open—press the middle, and she sealed so perfectly you couldn't see the line. Better than zippers.

"Well, we stared at the fire for a while and I decided to attempt some sort of communication with the Martian. I pointed at myself and said 'Dick.' He caught the drift immediately, stretched a bony claw at me and repeated 'Tick.' Then I pointed at him, and he gave that whistle I called Tweel; I can't imitate his accent. Things were going smoothly; to emphasize the names, I repeated 'Dick,' and then, pointing at him, 'Tweel.'

"There we stuck! He gave some clacks that sounded negative, and said something like 'P-p-p-proot.' And that was just the beginning; I was always 'Tick,' but as for him—part of the time he was 'Tweel,' and part of the time he was 'P-p-p-proot,' and part of the time he was sixteen other noises! Tweel caught the idea, and informed me that three plus three equals six. Once more we seemed to be getting somewhere.

"So, knowing that Tweel had at least a grammar school education, I drew a circle for the sun, pointing first at it, and then at the last glow of the sun. Then I sketched Mercury, and Venus, and Mother Earth, and Mars, and finally, pointing to Mars, I swept my hand around in a sort of inclusive gesture to indicate that Mars was our current environment. I was working up to putting over the idea that my home was on the Earth.

"Tweel understood my diagram all right. He poked his beak at it, and with a great deal of trilling and clucking, he added Deimos and Phobos to Mars, and then sketched in the Earth's moon!

"Do you see what that proves? It proves that Tweel's race uses telescopes—that they're civilized!"

"Does not!" snapped Harrison. "The moon is visible from here as a fifth magni-

tude star. They could see its revolutions with the naked eye."

"The moon, yes!" said Jarvis. "You've missed my point. Mercury isn't visible! And Tweel knew of Mercury because he placed the moon at the third planet, not the second. If he didn't know Mercury, he'd put the Earth second, and Mars third, instead of fourth! See?"

"Humph!" said Harrison.

"Anyway," proceeded Jarvis, "I went on with my lesson. Things were going smoothly, and it looked as if I could put the idea over. I pointed at the Earth on my diagram, and then at myself, and then, to clinch it, I pointed to myself and then to the Earth itself shining bright green almost at the zenith.

"Tweel set up such an excited clacking that I was certain he understood. He jumped up and down, and suddenly he pointed at himself and then at the sky, and then at himself and at the sky again. He pointed at his middle and then at Arcturus, at his head and then at Spica, at his feet and then at half a dozen stars, while I just gaped at him.

"THEN, all of a sudden, he gave a tremendous leap. Man, what a hop! He shot straight up into the starlight, seventy-five feet if an inch! I saw him silhouetted against the sky, saw him turn and come down at me head first, and land smack on his beak like a javelin! There he stuck, square in the center of my sun-circle in the sand—a bull's-eye!"

"Nuts!" observed the captain. "Plain nuts!"

"That's what I thought, too! I just stared at him open-mouthed while he pulled his head out of the sand and stood up. Then I figured he'd missed my point, and I went through the whole blamed rigmarole again, and it ended the same way, with Tweel on his nose in the middle of my picture!"

"Maybe it's a religious rite," suggested Harrison.

"Maybe," said Jarvis dubiously. "Well, there we were. We could exchange ideas up to a certain point, and then—blooey! Something in us was different, unrelated; I don't doubt that Tweel thought me just as screwy as I thought him. Our minds simply looked at the world from different viewpoints, and perhaps his viewpoint is as true as ours. But—we couldn't get together, that's all. Yet, in spite of all difficulties, I liked Tweel, and I have a queer certainty that he liked me."

"Nuts!" repeated the captain. "Just daffy!"

"Anyway, I finally gave it up, and got into my thermo-skin to sleep. The fire hadn't kept me any too warm, but that damn sleeping bag did. Got stuffy five minutes after I closed myself in. I opened it a little and bingo! Some eighty-below-zero air hit my nose, and that's when I got this pleasant little frostbite to add to the bump I acquired during the crash of my rocket.

"I don't know what Tweel made of my sleeping. He sat around, but when I woke up, he was gone. I'd just crawled out of my bag, though, when I heard some twittering, and there he came, sailing down from that three-story Thyle cliff to alight on his beak beside me. I pointed to myself and toward the north, and he pointed at himself and toward the south, but when I loaded up and started away, he came along.

"Man, how he traveled—a hundred and fifty feet at a jump, sailing through the air stretched out like a spear, and landing on his beak. He seemed surprised at my plodding, but after a few moments he fell in beside me, only every few minutes he'd go into one of his leaps, and stick his nose into the sand a block ahead of me. Then he'd come shooting back at me; it kept me nervous at first to see that beak of his coming at me like a spear, but he always ended in the sand at my side.

"So the two of us plugged along across the Mare Chronium. We talked—not that we understood each other, you know, but just for company. I sang songs, and I suspect Tweel did too; at least, some of his trillings and twitterings had a subtle sort of rhythm.

"Then, for variety, Tweel would display his smattering of English words. He'd point to an outcropping and say 'rock,' and point to a pebble and say it again; or he'd touch my arm and say 'Tick,' and then repeat it. He seemed terrifically amused that the same word meant the same thing twice in succession, or that the same word could apply to two different objects. It set me wondering if perhaps his language wasn't like the primitive speech of some Earth people—you know, Captain, like the Negritos, for instance, who haven't any generic words. No word for food or water or man, but words for *good* food and *bad* food, or *rain* water and *sea* water, or *strong* man and *weak* man—but no names for general classes. They're too primitive to understand that rain water and sea water are just different aspects of the same thing. But that wasn't the case with Tweel; is was just that we were somehow mysteriously different—our minds were alien to each other. And yet—we liked each other!"

"Looney, that's all," remarked Harrison. "That's why you two were so fond of each other."

"Well, I like you!" countered Jarvis wickedly. "Anyway," he resumed, "don't overlook the point that he managed to understand a little of my mental workings, while I never even got a glimmering of his."

"Because he didn't have any!" suggested the captain, while Schatz and Leroy blinked attentively.

"YOU can judge of that when I'm through," said Jarvis. "Well, we plugged along across the Mare Chronium. Mare Chronium—Sea of Time! It was so monotonous that I was even glad to see the desert of Xanthus toward the evening of the second day.

"I was fair worn out, but Tweel seemed

as fresh as ever, for all I never saw him drink or eat. I offered him some water once or twice; he took the cup from me and sucked the liquid into his beak, and then carefully squirted it all back into the cup and gravely returned it.

"Just as we sighted Xanthus, or the cliffs that bounded it, one of those nasty sand clouds blew along, not as bad as the one we had here, but mean to travel against. After the sand storm blew over, a little wind kept blowing in our faces, not strong enough to stir the sand. But suddenly things came drifting along from the Xanthus cliffs—small, transparent spheres, for all the world like glass tennis balls! But light—they were almost light enough to float even in this thin air—empty, too. I cracked open a couple and nothing came out but a bad smell. I asked Tweel about them, but all he said was 'No, no, no,' which I took to mean that he knew nothing about them. So they went bouncing about like tumbleweeds, or like soap bubbles, and we plugged on toward Xanthus. Tweel pointed at one of the crystal balls once and said 'rock,' but I was too tired to argue with him. Later I discovered what he meant.

"We came to the bottom of the Xanthus cliffs finally, when there wasn't much daylight left. We were ambling around the base of the Xanthus barrier looking for an easy spot to climb. At least, I was. Tweel could have leaped it easily, for the cliffs were lower than Thyle—perhaps sixty feet. I found a place and started up, swearing at the water tank strapped to my back—it didn't bother me except when climbing—and suddenly I heard a sound that I thought I recognized!

"You know how deceptive sounds are in this thin air. A shot sounds like the pop of a cork. But this sound was the drone of a rocket, and sure enough, there went our second auxiliary about ten miles to westward, between me and the sunset!"

"Vas me!" said Schatz. "I hunt for you."

"Yeah; I knew that, but what good did it do me! I hung on to the cliff and yelled and waved with one hand. Tweel saw it too, and set up a trilling and twittering, leaping to the top of the barrier and then high into the air. And while I watched, the machine droned on into the shadows to the south.

"I was bitterly disappointed by the failure to attract attention. I pulled out my thermoskin bag and crawled into it, as the night chill was already apparent. Tweel stuck his beak into the sand and drew up his legs and arms and looked for all the world like one of those leafless shrubs out there. I think he stayed that way all night."

"Protective mimicry!" ejaculated Leroy. "See? He is desert creature!"

"In the morning," resumed Jarvis, "we started off again. We hadn't gone a hundred yards into Xanthus when I saw something queer! This is one thing Schatz didn't photograph, I'll wager!

"There was a line of little pyramids—tiny ones, not more than six inches high, stretching across Xanthus as far as I could see! Little buildings made of pygmy bricks, they were, hollow inside and truncated, or at least broken at the top and empty. I pointed at them and said 'What?' to Tweel, but he gave some negative twitters to indicate, I suppose, that he didn't know. So off we went, following the row of pyramids because they ran north, and I was going north.

"Man, we trailed that line for hours! After a while, I noticed another queer thing: they were getting larger. Same number of bricks in each one, but the bricks were larger.

"By noon they were shoulder high. I looked into a couple—all just the same, broken at the top and empty. I examined a brick or two as well; they were silica, and old as creation itself!"

"How do you know?" asked Leroy.

"They were weathered—edges rounded. Silica doesn't weather easily even on Earth, and in this climate—!"

"How old you think?"

"FIFTY THOUSAND—a hundred years. How can I tell? The little ones we saw in the morning were older—perhaps ten times as old. Crumbling. How old would that make them? Half a million years? Who knows?" Jarvis paused a moment. "Well," he resumed, "we followed the line. Tweel pointed at them and said 'rock' once or twice, but he'd done that many times before. Besides, he was more or less right about these.

"I tried questioning him. I pointed at a pyramid and asked 'People?' and indicated the two of us. He set up a negative sort of chuckling and said, 'No, no, no. No one-one-two. No two-two-four,' meanwhile rubbing his stomach. I just stared at him and he went through the business again. 'No one-one-two. No two-two-four.' I just gaped at him."

"That proves it!" exclaimed Harrison. "Nuts!"

"You think so?" queried Jarvis sardonically. "Well, I figured it out different! 'No one-one-two!' You don't get it, of course, do you?"

"Nope—nor do you!"

"I think I do! Tweel was using the few English words he knew to put over a very complex idea. What, let me ask, does mathematics make you think of?"

"Why—of astronomy. Or—or logic!"

"That's it! 'No one-one-two!' Tweel was telling me that the builders of the pyramids weren't people, that they weren't intelligent, that they weren't reasoning creatures! Get it?"

"Huh! I'll be damned!"

"You probably will."

"Why did Tweel rub his belly?" Leroy asked.

"Why? Because, my dear biologist, that's where his brains were! Not in his tiny head—in his middle!"

"*C'est impossible!*"

"Not on Mars, it isn't! This flora and

fauna aren't earthly; your biopods prove that!" Jarvis grinned and took up his narrative. "Anyway, we plugged along across Xanthus and in about the middle of the afternoon, something else queer happened. The pyramids ended."

"Ended!"

"Yeah; the queer part was that the last one—and now they were ten-footers—was capped! See? Whatever built it was still inside; we'd trailed 'em from their half-million-year-old origin to the present.

"Tweel and I both noticed it about the same time. I yanked out my automatic (I had a clip of Boland explosive bullets in it) and Tweel, quick as a sleight-of-hand trick, snapped a queer little glass revolver out of his bag. It was much like our weapons, except that the grip was larger to accommodate his four-taloned hand. And we held our weapons ready while we sneaked up along the lines of empty pyramids.

"Tweel saw the movement first. The top tiers of bricks were heaving, shaking, and suddenly slid down the sides with a thin crash. And then—something—something was coming out!

"A long, silver-gray arm appeared, dragging after it an armored body. Armored, I mean, with scales, silver-gray and dull-shining. The arm heaved the body out of the hole; the beast crashed to the sand.

"It was a nondescript creature—body like a big gray cask, arm and a sort of mouth-hole at one end; stiff, pointed tail at the other—and that's all. No other limbs, no eyes, ears, nose—nothing! The thing dragged itself a few yards, inserted its pointed tail in the sand, pushed itself upright, and just sat.

"Tweel and I watched it for ten minutes before it moved. Then, with a creaking and rustling like—oh, like crumpling stiff paper—its arm moved to the mouth-hole and out came a brick! The arm placed the brick carefully on the ground, and the thing was still again.

"Another ten minutes—another brick. Just one of Nature's bricklayers. I was about ready to slip away and move on when Tweel pointed at the thing and said 'rock!' I went 'huh?' and he said it again. Then, to the accompaniment of some of his trilling, he said, 'No—no—,' and gave two or three whistling breaths.

"Well, I got his meaning, for a wonder! I said, 'No breath?' and demonstrated the word. Tweel was ecstatic; he said, 'Yes, yes, yes! No, no, no breet!' Then he gave a leap and sailed out to land on his nose about one pace from the monster!

"I WAS startled, you can imagine! The arm was going up for a brick, and I expected to see Tweel caught and mangled, but—nothing happened! Tweel pounded on the creature, and the arm took the brick and placed it neatly beside the first. Tweel rapped on its body again, and said 'rock,' and I got up nerve enough to take a look myself.

"Tweel was right again. The creature was rock, and it didn't breathe!"

"How you know?" snapped Leroy, his black eyes blazing interest.

"Because I'm a chemist. The beast was made of silica! There must have been pure silicon in the sand, and it lived on that. Get it? We, and Tweel, and those plants out there, and even the biopods are carbon life; this thing lived by a different set of chemical reactions. It was silicon life!"

"*La vie silicieuse!*" shouted Leroy. "I have suspect, and now it is proof! I must go see! *Il faut que je—*"

"All right! All right!" said Jarvis. "You can go see. Anyhow, there the thing was, alive and yet not alive, moving every ten minutes, and then only to remove a brick. Those bricks were its waste matter. See, Frenchy? We're carbon, and our waste is carbon dioxide, and this thing is silicon, and its waste is silicon dioxide—silica. But silica is a solid, hence the bricks. And it built itself in, and when it was covered, it moved over to a fresh place to start over. No wonder it creaked! A living creature half a million years old!"

"How you know how old?" Leroy was frantic.

"We trailed its pyramids from the beginning, didn't we? If this weren't the original pyramid builder, the series would have ended somewhere before we found him, wouldn't it? Ended and started over with the small ones. That's simple enough, isn't it?

"But he reproduces or tries to. Before the third brick came out, there was a little rustle and out popped a whole stream of those little crystal balls. They're his spores, or eggs, or seeds—call 'em what you want. They went bouncing by across Xanthus just as they'd bounced by us back in the Mare Chronium. I've a hunch how they work, too—this is for your information, Leroy. I think the crystal shell of the silica is no more than a protective covering, like an eggshell, and that the active principle is the smell inside. It's some sort of gas that attacks silicon, and if the shell is broken near a supply of that element, some reaction starts that ultimately develops into a beast like that one."

"You should try!" exclaimed the little Frenchman. "We must break one to see!"

"Yeah? Well, I did. I smashed a couple against the sand. Would you like to come back in about ten thousand years to see if I planted some pyramid monsters? You'd most likely be able to tell by that time!" Jarvis paused and drew a deep breath. "Lord! That queer creature! Do you picture it? Blind, deaf, nerveless, brainless—just a mechanism, and yet—immortal! Bound to go on making bricks, building pyramids, as long as silicon and oxygen exist, and even afterwards it'll just stop. It won't be dead. If the accidents of a million years bring it its food again, there it'll be, ready to run again, while brains and civilizations are part of the past. A queer beast—yet I met a stranger one!"

(Continued on page 118)

SCIENCE ?? Question ?? BOX

X-RAYS

Editor, SCIENCE QUESTION BOX:

Of what use, besides being an aid to surgery, are X-rays? Can you give me a number of illustrations of some of the other functions?—C. M., Cambridge, Mass.

One interesting use to which X-rays are put is to destroy a microbe which attacks the leaves of the tobacco plant. Many other X-ray appliances have nothing to do with medicine. Custom-house officials sometimes examine bales and packages to find whether objects liable to duty have been concealed in them. Shoemakers use them for the designing of special pairs of shoes, to conform with a customer's physical requirements. Rare stones can, in many cases, be distinguished from imitations when examined with the X-ray. The diamond will appear transparent, while imitation stones look almost black. Engineers use X-rays to find flaws in the casting of elaborate parts for machines. And finally, the X-ray has revealed to science the crystal structure of atoms, a contribution that has aided physicists tremendously in unlocking the secrets of the elements.—Ed.

FUTURE EVOLUTION

Editor, SCIENCE QUESTION BOX:

Evolution is supposed to be a continuous process. If that is the case, why isn't man affected?—O. B., Duluth, Minnesota.

Man is being affected by evolution, and he is constantly evolving! That's the opinion of Dr. Ales Hrdlicka, curator of physical anthropology of the Smithsonian Institution. Dr. Hrdlicka bases his outlook for the human future partly on the unique collection of 16,000 human skulls which he has assembled during a lifetime of work in the U. S. National Museum. Ancient and modern skulls alike show great variability in both size and shape; and as long as a species is capable of variation it is evolutionally youthful.

Man's cousins, the great apes, however, *have no such cheerful future before them;* they are senile races, headed down the hill. The skulls of great apes, however, display a higher degree of specialization, a freezing into one standardized form for each species. This spells biological conservatism, stagnation, eventual extinction. Dr. Hrdlicka accords the greatest variability, and hence the best chance evolutionally, to the adaptable chimpanzee.

Although the best brains of today are not better than those of ancient Greece and Egypt, the average is higher, the veteran anthropologist declared. The geniuses of antiquity were centuries ahead of their times—unique and lonely individuals. Nowadays the average man in the street is much closer to his Einsteins and Shaws than his counterpart in old Athens was to Plato.

Head sizes are increasing in America, Dr. Hrdlicka stated, on the basis of the many measurements he has taken at meetings of many American scientific, professional and business men.—Ed.

GIANT INSECTS

Editor, SCIENCE QUESTION BOX:

We're used to reading stories of giant insects in scientifiction stories. Scientifically speaking, what are the chances of giant insects ever dominating mankind?—E. S., Elizabeth, N. J.

Pick up the next grasshopper you see and study his method of breathing. It is easy to see a row of holes on each side of his jointed armorlike covering, at his abdomen. Air rushes into these holes at every swell of his body. They are merely entrances to a series of branching white tubes which divide again and again to carry air directly to every cell—tubes as fine as gossamer. And they function perfectly, as nature intended them to.

But for this breathing apparatus to function, the whole thing must remain tiny! Let an insect become larger than a few ounces in weight, and his breathing tubes won't work well. The weight of his body presses too hard on the tiny tubes, oxygen can't get through them fast enough, and the creature bogs down. Because of this fact an insect weighing a pound is hard to imagine.

(Concluded on page 129)

In this department the editors of STARTLING STORIES will endeavor to answer your questions on modern scientific facts. Please do not submit more than three questions in your letter. As many questions as possible will be answered here, but the editors cannot undertake any personal correspondence. Naturally, questions of general interest will be given the preference. Address your questions to SCIENCE QUESTION BOX, STARTLING STORIES, 22 West 48th Street, New York City.

IT'S BEEN exactly one year since we launched STARTLING STORIES. Dedicated to the exploration of the unknown, the prophecy of things to come—it's the magazine of tomorrow!

With its first issue STARTLING STORIES introduced a brand-new policy in scientifiction by pledging to present a book-length masterpiece of fantasy in every number. It was a bold promise, but we felt certain we could fulfil it.

Even our heartiest well-wishers said it couldn't be done. That no magazine could continue to maintain the excellent standard set by the first number. That it would be impossible to score a perfect bull's-eye with each successive novel.

Well, we did it! The six most outstanding fantasy writers in the field were recruited—and today we can see six blazing candles on our anniversary cake—six candles representing the half dozen most distinguished novels published within the last year.

What more fitting than Jack Williamson's novel, "The Fortress of Utopia," to celebrate our first birthday? It's Williamson's greatest work, we think, rich in drama and scientific vision. Please let me know your opinion of it.

Weinbaum's First Story

Your nomination for the Hall of Fame—Stanley G. Weinbaum's first story, "A Martian Odyssey," appears in this issue. This story is destined to be remembered forever as one of fantasy's immortal classics.

Incidentally, Stanley G. Weinbaum wrote a sequel to "A Martian Odyssey." It's quite long, and every bit as good as its predecessor. Weinbaum called it "The Valley of Dreams," and if you'd like to see it published in this magazine, drop us a line.

The Three Planeteers

From Mercury to Pluto,
From Saturn back to Mars,
We'll fight and sail and blaze our trail
In crimson through the stars!

Recognize the song? It's the battle-cry of The Three Planeteers, and they're coming—in our next issue. From Venus, Earth and Mercury, the three most glamorous adventurers of the spaceways band together for a secret purpose.

It's all for one and one for all as this unique trio of tomorrow's daredevils challenges the most baffling enigma in the Solar System in a dynamic novel of the future.

You've acclaimed Edmond Hamilton's masterful novel, "The Prisoner of Mars," as one of the four-star hits of all-time. Now read Hamilton's latest, THE THREE PLANETEERS, for a scientifiction treat that's streamlined with thrills! It's the feature novel for the next issue.

Another memorable classic from yesterday in the Hall of Fame for the January issue. More short stories. A new collection of THRILLS IN SCIENCE, a new SCIENTIFIC CROSSWORD PUZZLE. And many other features including THEY CHANGED THE WORLD, SCIENCE QUESTION BOX, and the Guest Editorial in this banner number.

Here's thanks for sitting in on our birthday party. And here's to the years to come!

—THE EDITOR

THE ETHER VIBRATES—with the letters sent in by loyal followers of science fiction. Add your voice! This department is a public forum devoted to your opinions, suggestions and comments — and we're anxious to hear from you. Remember, this is YOUR magazine and is planned to fulfill all your requirements. Let us know which stories and departments you like — and which fail to click with you. A knock's as welcome as a boost—speak right up and we'll print as many of your letters as possible. We cannot undertake to enter into private correspondence. Address THE ETHER VIBRATES, STARTLING STORIES, 22 West 48th St., New York, N. Y.

LETTERS FROM READERS

WILLIAMS NOVEL DIFFERENT

By Gene Thornton Newsome

May I add my comment to that of the thousands of other enthusiastic readers of STARTLING STORIES and scientifiction?

Robert Moore Williams' "The Bridge to the Earth" is so utterly different from any science fiction tale that I have ever read in these past two years that I plead on bended knee for more of such different stories. I am afraid it would be a different story entirely if the happenings had occurred in 1940 or '41. We would have no defense against miscroscopic beings as the Marlings; or would we?

Robert Arthur's "Cosmic Stage" was a superb short story. More dimension stories are hoped for from this guy.

"The Misty Wilderness" had a somewhat common plot but was interesting; not as a science fiction story but as an adventure story.

Your Hall of Fame story is the type that

leaves you wondering too much. Can't say I liked it too well, although I enjoy Hamilton's stories generally. They are definitely full of life.

Hope I can say more for the next issue. This one has left me short-winded.—1503 Lincoln Avenue, Norman, Oklahoma.

ANALYSIS

By Louis Goldstone, Jr.

A few comments on the progress of STARTLING STORIES. First of all, I realize that any and all evaluations of fiction are purely relative. Each reader rates the stories according to the measure of enjoyment and pleasure derived from the reading; at least, I believe that this can be the only true standard of rating. Some people, of course are ever-vigilant for scientific flaws, etc., and often overlook examples of well-applied science or allow trifling inaccuracies to spoil for them a good piece of science fiction. Personally, I read primarily for enjoyment, and have incidentally acquired a fair store of genuine scientific knowledge from science fiction over a period of ten years.

There can be no doubt that science fiction is improving in quality. I say that as a generalization, for the nine magazines on the stands today shovel a good deal that smells along with the worthy. STARTLING STORIES, I think, is getting its second wind. The magazine began with Weinbaum's "Black Flame," staggered a bit with Binder's "Impossible World," a story that was, to my mind, saved from mediocrity by Finlay's illustrations, broke stride and almost dropped out with Hamilton's "Prisoner of Mars," gritted its teeth and kept pounding with Wellman's "Giants from Eternity," and now forges ahead again with Williams' "Bridge to Earth." I look forward to Williamson's coming story, which I am sure will not be disappointing.

In "Bridge to Earth," I was pleased by the author's explanation of the phenomenon of the "flaming death" as being the manifestation of electrons dropping to the lower energy-levels. I cannot recall having seen this idea used before. While the "Bridge to Earth" is no new plot, and embodies old ideas, it is written in that pleasing style which makes Williams one of my favorite authors. His short stories, such as "Beyond That Curtain" were very good. I hope to see more of his work in the near future.

One request—regarding your illustrations. Pictures can make or break a story. The artist illustrating a novel, or a short, gives the reader his first impression of the yarn. An impression that is difficult to break. So keep your good artists—and get rid of the unpopular ones. My own preferences are Schneeman, Wesso, and Finlay. Wesso was at his best in the "Bridge to Earth"; those pictures of the Marlings in the human spinal column were great. Finlay's drawing on page 37 of the March, 1939, issue was a masterpiece! His drawing for "Cosmic Stage" in the current issue was quite good.

On the whole, I like STARTLING STORIES, and I am sure that it will have a fine future. Keep away from hack-writing. If you can do this, you're all set. I think you are trying, and that's all that can be expected.

The reprints are satisfactory. However, as long as your choice of reprints is restricted to shorts, how about "City of the Living-Dead" by Manning and Pratt?

Your cover contest looks interesting. Big-headed monsters dragging beautiful babes from their desecrated graves.

Brown does well on the covers. You might, however, try Wesso on one some time.

Anyway, long live STARTLING STORIES! And THRILLING WONDER STORIES too!—622 Presidio Ave., San Francisco, Calif.

FEMININE-LESS ISSUE

By Isaac Asimov

There is a great deal of significance, I think, in the fact that the four stories of the September issue of STARTLING STORIES did not contain a single female character. Of course, I would be the last to claim that all females be abolished. Women, when handled in moderation and with extreme decency, fit nicely in scientifiction of *times*. However, the September issue goes to prove that good stories can be written even with the total absence of the weaker sex.

There are some fans that claim "human interest" a necessity in stf. since otherwise stories degenerate into uninteresting scientific or semi-scientific recitals. That is a very correct stand, or would be if it were not that these one-track-minded fans know no other form of human interest than the love interest.

Well, let them read "Bridge to Earth" and tell me what it loses in not possessing a heroine. Where would the story have been improved in having a heroine get caught by the microscopic creatures and having the hero rescue her, getting her caught again, having the hero rescue her again, then the hero getting caught and the heroine rescuing *him*? That *always* happens when a shemale is brought in (usually by the hair) and if that's human interest (or any other kind of interest) then I'm a pickled herring.

Three cheers for R. M. Williams for refraining from falling into this morass of hack.

However, Mr. Williams falls into a different error of purely scientific nature, which, since it has been indulged in by various authors ever since the beginnings of stf., it is high time to correct once and for all.

In reducing a man to microscopic size by compressing the spaces between the atoms, you reduce his size all right but you *don't* reduce his mass—since all the atoms originally in him remain unchanged in mass or number. In short, the microscopic hero weighs his full quota of 160 pounds though no bigger than the dot of an i on this page. In such a condition, his density approaches pretty near neutronium, and normal human beings and normal matter (the Earth itself, even) are to him only a rather thick vacuum. When coughed out onto the carpet, for instance, he would sink to the very center of the earth, because nothing on earth can hold up 160 pounds compressed into a microscopic granule.

Of course, a small army of men, all weighing 160 pounds plus a military tank as well, all inside one poor suffering human is just too ridiculous.

This is not to say that I did not enjoy the yarn. I did. But sometimes I do wish that authors when shrinking or expanding their characters either remember that mass remains unchanged or choose some method other than changing the amount of space between atoms. —174 Windsor Place, Brooklyn, N. Y.

STARTLINGLY DIFFERENT

By Ray E. Gower

You are certainly to be congratulated on the type of scientifiction stories that are finding their way into STARTLING STORIES. Every issue seems to get away from the usual run of stories into something startlingly different.

I believe you will better appreciate my opinion of your magazine if I tell you that I have followed nearly all the scientifiction magazines since the days of "Doctor Hackensaw's Secrets" in the old Electrical Experimenter.—1403 W. Southern Avenue, S. Williamsport, Penna.

NOMINATIONS

By James E. Wilson

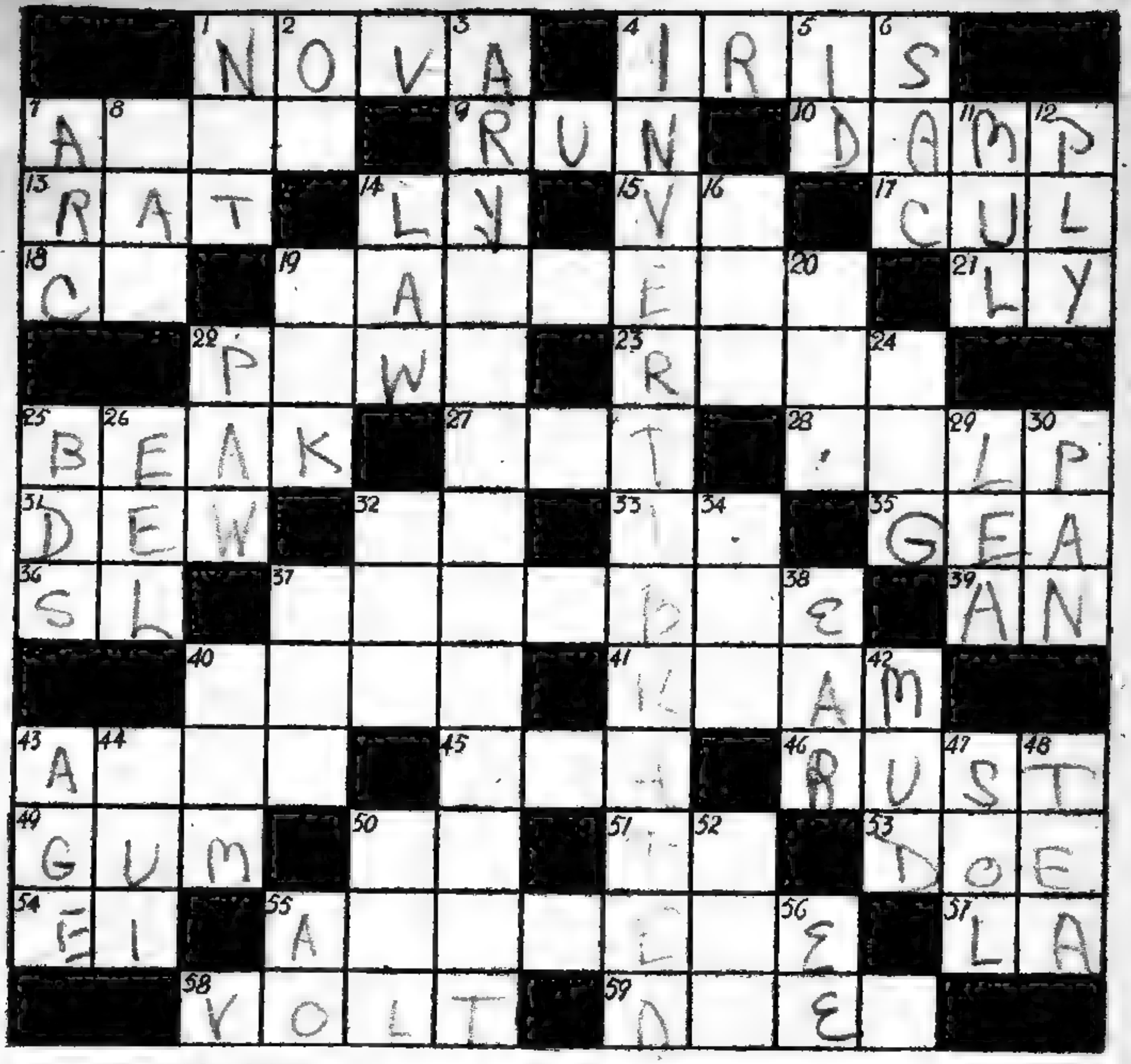
I started reading STARTLING STORIES with the May issue and I want to say: "It's swell!" I have not enjoyed a long novel so much since the old days. As a matter of fact, good long novels have been pretty scarce lately, and I'm glad to see them back.

I too am in favor of your printing Manning's "Seeds From Space" in your Hall of Fame. This story originally appeared in the June, 1935, issue of Wonder Stories, and I am certain those who have not already read it will consider the yarn excellent. Another story I would like to see again is "The Mole-Men of Mercury."

I wish to congratulate Mr. Hamilton on his "Prisoner of Mars." It was a remarkable story, and everything seemed plausible, but one thing. How in the world did the people in the matter caster get to the other matter caster? Wouldn't

(Concluded on page 117)

SCIENTIFIC CROSSWORD PUZZLE



HORIZONTAL

1—Star which suddenly flares up in the heavens and soon fades away again to its former magnitude
4—Colored circle that surrounds the pupil of the eye
7—Compound of hydrogen in which all or part of the hydrogen may be exchanged for a metal or basic radical, forming a salt
9—Move rapidly from point to point
10—Moist
13—Rodent
14—Adjective suffix to signify dealing with or connected with
15—Left-hand page of a book (abbr.)
17—Depression between two mountains
18—Hundredth of a liter (abbr.)
19—Squared stones
21—Like (suffix)
22—American panther
23—Image formed by convergence of actual rays
25—Bill of a bird
27—Corrode, as a metal, by the action of oxygen or of an acid
28—Jointed sensitive organ or feeler
31—Moisture condensed from the atmosphere in small drops upon the upper surface of plants
32—International language
33—Geological prefix, indicating beginning of an epoch
35—Climbing annual herb of bean family
36—South latitude (abbr.)
37—Efficient
39—Indefinite article
40—Rave
41—Enlarge a hole with a rotating cutter
43—Double sulfate or selenate
45—Highest chronological division of geological history
46—Coating caused on iron or steel by oxidation
49—Fluid form of matter which is elastic
50—Metallic element of the rare earth group (abbr.)
51—Dark-gray metallic element found in small quantities in many minerals (abbr.)
53—Female deer
54—For instance (abbr.)
55—Colorless volatile liquid obtained by distilling amyl alcohol with zinc chloride
57—Sixth tone of the diatonic scale
58—Rate of flow of electricity
59—Ovule from which a plant may be reproduced

VERTICAL

1—Egg of an insect
2—Hypothetical force formerly supposed by some to pervade all nature

3—Genus of fossil reptilian birds
4—Animals having no spinal column
5—In Weismann's theory of heredity, a unit of germ-plasm
6—Membranous pouch
7—Bow of flame occurring between two adjacent electrodes when connected with a powerful source of electricity
8—Metallic element belonging to the alkaline earth metals (abbr.)
11—Gram-molecule
13—Go back and forth between points
14—Doctrine
16—Natural substance containing metal
19—Short-winged, web-footed diving bird of northern seas
20—Liquid juice of plants
23—Foot of an animal having nails or claws
24—Piece of soft metal, usually in the form of a rotating disk, used in cutting gems and polishing hard metal
25—Bachelor of Dental Surgery (abbr.)
26—Snakelike fish
29—Meadow
30—Separate (gold) by shaking gold-bearing earth with water
32—Goddess of the sea
34—Forming diminutives (suffix)
37—Non-circular or eccentric rotating piece, to give reciprocating motion
38—Organ of hearing
40—Russia (abbr.)
42—Wet earth
43—Entire period of life of a person
44—Retardation of magnetization in respect of a magnetizing force
47—Colloid suspended in liquid
48—Beverage
50—Ostrichlike Australian bird
52—Suffix used to indicate hydrocarbons of the acetylene series
55—Noting a compound having properties of or derived from an aldehyde (abbr.)
56—Electrical Engineer (abbr.)

The Solution Is on Page 129—If You MUST Look!

THE ETHER VIBRATES

(Concluded from page 115)

the rotation of the two planets put the opposite matter caster on the side turned away from the other caster? However, it was still a good story and I'm looking forward to many more like it. —R. No. 1, Hunter's Cottages, Hot Springs, Arkansas.

(Your point concerning the relative positions of the two matter casters varying because of the two planets' rotations is a valid one. However, both Earth and Mars revolve on their axis once each twenty-four hours—Mars in slightly less time. So Philip Crain operated the matter caster only when the two were in opposition.—Ed.)

TO ALL FRIENDS AND FANS OF THE LATE HOWARD PHILLIPS LOVECRAFT

By Donald Wandrei and August W. Derleth

After two years of careful editing, the works of H. P. Lovecraft are beginning to take shape in readiness for the eyes of a printer. At this writing—June, 1939—the first volume, *The Outsider and Others*, is ready to go to press, provided that enough subscriptions to it are forthcoming to justify our personally guaranteeing the cost of printing. Because *The Outsider and Others* is an omnibus volume containing, with but a few minor exceptions, all the stories of Lovecraft, together with his complete and recently revised *Supernatural Horror in Literature*, and an introductory biographical sketch of Lovecraft, printing costs make it necessary for us to ask $3.50 per copy for the *Outsider and Others*, if ordered before publication, $5.00 if ordered after.

We plan to publish so that the book will be ready for distribution in December of this year. But, frankly, we must have subscriptions first; if we have a sufficient quantity of books on order by September or October first, we will instruct the printer to go forward. And when we write "subscriptions," we mean cash in hand; in other words, we are asking those who want copies of this book to send their checks to August Derleth, Sauk City, Wisconsin, as soon as possible. These checks will be deposited against the expense of publication; any net profit, of course, will go to Mrs. Gamwell—but there is little chance of net profit.

We need not take space to "sell" this book to you who have known the work of HPL. But we do ask for your utmost co-operation in this important publishing event, we do want you to talk this book up among fellow fans who may not be so familiar with Lovecraft's work, and we do want you to send in your own checks just as soon as possible, so that we can go ahead with the printing of this book. If, after two or three months, insufficient funds have been pledged or sent, and we find it impossible to go on with plans at this time, all money will be refunded. But such a situation will certainly not arise if we have the co-operation we have every reason to expect.

Let us hear from you just as soon as possible. We are planning an edition of only 1000 copies, but in case of orders in advance of this number, our print order will be raised.

MASTERFUL NOVEL

By Art R. Sehnert

I have just finished reading your July issue of STARTLING STORIES. I have yet to see a better story than the one, "Giants From Eternity." Wellman wrote the novel masterfully. Never was a story told more interestingly. His characterization of Pasteur *et al.* is beyond doubt a literary masterpiece. I would like to compliment him on one point especially: when Norfleet returned the five immortal scientists to life, Wellman didn't state whether or not their souls returned to their bodies. Well, Wellman must be an excellent diplomat. Only a well informed psychologist would have known that any mention of the word "soul" would have offended some people, and that denying its return would have offended some others—so he did the only sensible thing, and didn't mention that angle. Here is my nomination of Manly Wade Wellman for ranking with scientifiction's leading ten writers.

I think your feature Hall of Fame an excellent contribution to scientifiction. I know I would not have had the pleasure of reading "World Without Name" otherwise.

Could you possibly add a department to S.S.? One where we readers, who like to theorize, could expound our theories, and receive criticisms from fellow readers concerning these speculations. How about it, readers?—791 Maury, Memphis, Tenn.

CARLYLE AND QUADE

By Samuel Simpson

In the January issue of STARTLING STORIES Arthur K. Barnes announced plans for a book-length novel of Gerry Carlyle and Tony Quade. In the March number five readers backed up this proposal, while one was opposed. In the May S.S. only one letter touched on the subject and that contributed a vote for the novel. There have been many other votes in favor of a Carlyle-Quade novel in S.S.—so when do we get one?

(Carlyle and Quade are characters belonging to THRILLING WONDER STORIES, and we don't see enough of them even there. See the October issue of T.W.S., which features a long novelet by Kuttner and Barnes and both characters!—Ed.)

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A MARTIAN ODYSSEY

(Continued from page 112)

"If you did, it must have been in your dreams!" growled Harrison.

"You're right!" said Jarvis soberly. "In a way, you're right. The dream-beast! That's the best name for it—and it's the most fiendish, terrifying creation one could imagine! More dangerous than a lion, more insidious than a snake!"

"Tell me!" begged Leroy. "I must go see!"

"Not this devil!" He paused again. "Well," he resumed, "Tweel and I left the pyramid creature and plowed along through Xanthus. I was tired and a little disheartened by Schatz's failure to pick me up, and Tweel's trilling got on my nerves, as did his flying nosedives. So I just strode along without a word, hour after hour across that monotonous desert.

"Toward mid-afternoon we came in sight of a low dark line on the horizon. It was a canal.

"We approached the canal slowly; I remembered that this one was bordered by a wide fringe of vegetation and that Mudheap City was on it.

"I WAS tired. I kept thinking of a good hot meal, and from that I jumped to reflections of how nice and homelike even Borneo would seem after this crazy planet, and from that, to thoughts of little old New York, and then to thinking about a girl I know there—Fancy Long. Know her?"

"'Vision entertainer,'" said Harrison. "I've tuned her in. Nice blonde—dances and sings on the Yerba Mate hour."

"That's her," said Jarvis ungrammatically. "I know her pretty well—just friends, get me—though she came down to see us off in the Ares. Well, I was thinking about her, feeling pretty lonesome, and all of a sudden, there she was.

"Yes, there she was—Fancy Long, standing plain as day under one of those crackbrained trees, and smiling and waving just the way I remembered her when we left!"

"Now you're nuts, too!" observed the captain.

"Boy, I almost agreed with you! I stared and pinched myself and closed my eyes and then stared again—and every time, there was Fancy Long smiling and waving! Tweel saw something too; he was trilling and clucking away, but I scarcely heard him. I was bounding toward her over the sand, too amazed even to ask myself questions.

"I wasn't twenty feet from her when Tweel caught me with one of his flying leaps. He grabbed my arm, yelling, 'No—no—no!' in his squeaky voice. I tried to shake him off—he was as light as if he were built of bamboo—but he dug his claws in and yelled. And finally some sort of sanity returned to me and I stopped less than ten feet from her. There she stood, looking as solid as Schatz's head!"

"Vot?" said the engineer.

"She smiled and waved, and waved and smiled, and I stood there as dumb as Leroy, while Tweel squeaked and chattered. I knew it couldn't be real, yet—there she was!

"Finally I said, 'Fancy! Fancy Long!' She just kept on smiling and waving, but looking as real as if I hadn't left her thirty-seven million miles away.

"Tweel had his glass pistol out, pointing it at her. I grabbed his arm, but he tried to push me away. He pointed at her and said: 'No breet! No breet!' and I understood that he meant that the Fancy Long thing wasn't alive. Man, my head was whirling!

"Still, it gave me the jitters to see him pointing his weapon at her. I don't know why I stood there watching him take careful aim, but I did. Then he squeezed the handle of his weapon; there was a little puff of steam, and Fancy Long was gone! And in her place was one of those writhing, black, rope-armed horrors like the one I'd saved Tweel from!

"The dream-beast! I stood there dizzy, watching it die while Tweel trilled and whistled. Finally he touched my arm, pointed at the twisting thing, and said: 'You one-one-two, he one-one-two.' After he'd repeated it eight or ten times, I got it. Do any of you?"

"*Oui!*" shrilled Leroy. "*Moi—je le comprends!* He mean you think of something, the beast he know, and you see it! *Un chien* —a hungry dog he would see a big bone with meat! Or smell it—not?"

"Right!" said Jarvis. "The dream-beast uses its victim's longings and desires to trap its prey. The bird at nesting season would see its mate, the fox, prowling for its own prey would see a helpless rabbit!"

"How he do?" queried Leroy.

"How do I know? How does a snake back on Earth charm a bird into its very jaws? And aren't there deep-sea fish that lure their victims in their mouths? Lord!" Jarvis shuddered. "Do you see how insidious the monster is? We're warned now—but henceforth we can't trust even our eyes. You might see me—I might see you—and back of it be nothing but another of those black horrors!"

"How'd your friend know?" asked the captain abruptly.

"Tweel? I wonder! Perhaps he was thinking of something that couldn't possibly have interested me, and when I started to run, he realized that I saw something different and was warned. Or perhaps the dream-beast can only project a single vision and Tweel saw what I saw—or nothing. I couldn't ask him. But it's just another proof that his intelligence is equal to ours or greater."

"HE'S daffy, I tell you!" said Harrison. "What makes you think his intellect ranks with the human?"

"Plenty of things! First, the pyramid-beast. He hadn't seen one before; he said as much. Yet he recognized it as a dead-alive automaton of silicon."

(Continued on page 120)

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(Continued from page 119)

"He could have heard of it," objected Harrison. "He lives around here, you know."

"Well, how about the language? I couldn't pick up a single idea of his and he learned six or seven words of mine. And do you realize what complex ideas he put over with no more than those six or seven words? The pyramid-monster—the dream-beast! In a single phrase he told me that one was a harmless automaton and the other a deadly hypnotist. What about that?"

"Huh!" said the captain.

"Huh if you wish! The point I'm making is that Tweel and his race are worthy of our friendship. Somewhere on Mars—and you'll find I'm right—is a civilization and culture equal to ours, and maybe more than equal. And communication is possible between them and us; Tweel proves that. It may take years of patient trial, for their minds are alien, but less alien than the next minds we encountered—if they are minds."

"The next ones? What next ones?"

"The people of the mud cities along the canals," Jarvis frowned, then resumed his narrative. "I thought the dream-beast and the silicon-monster were the strangest beings conceivable, but I was wrong. The mound city I'd noticed from the rocket was a mile or so to the right and I was curious enough to want to take a look at it.

"It has seemed deserted from my previous glimpse of it, and if any creatures were lurking in it—well, Tweel and I were both armed. And by the way, that crystal weapon of Tweel's was an interesting device; I took a look at it after the dream-beast episode. It fired a little glass splinter, poisoned, I suppose, and I guess it held at least a hundred of 'em to a load. The propellant was steam—just plain steam!"

"Shteam!" echoed Schatz. "From vot come shteam?"

"From water, of course! You could see the water through the transparent handle, and about a gill of another liquid, thick and yellowish. When Tweel squeezed the handle—there was no trigger—a drop of water and a drop of the yellow stuff squirted into the firing chamber, and the water vaporized—pop!—like that. I think we could develop the same principle. Concentrated sulphuric acid will heat water almost to boiling, and so will quicklime, and there's potassium and sodium—

"Anyway, we trudged along toward the mud-heap city and I began to wonder whether the city builders dug the canals. I pointed to the city and then at the canal, and Tweel said, 'No—no—no!' and gestured toward the south. I took it to mean that some other race had created the canal system, perhaps Tweel's people. I don't know; maybe there's still another intelligent race on the planet, or a dozen others. Mars is a queer little world.

"A hundred yards from the city we crossed a sort of road—just a hard-packed mud trail, and then, all of a sudden, along came one of the mound builders!

"Man, talk about fantastic beings! It looked rather like a barrel trotting along on four legs with four other arms or tentacles. It had no head, just body and members and a row of eyes completely around it. The top end of the barrel-body was a diaphragm stretched as tight as a drum head, and that was all. It was pushing a little coppery cart and tore right past us like the proverbial bat out of Hell. It didn't even notice us, although I thought the eyes on my side shifted a little as it passed.

"A moment later another came along, pushing another empty cart. Same thing—it just scooted past us. Well, I wasn't going to be ignored by a bunch of barrels playing train, so when the third one approached, I planted myself in the way—ready to jump, of course, if the thing didn't stop.

"But it did. It stopped and set up a sort of drumming from the diaphragm on top. And I held out both hands and said mildly: 'We are friends!' And what do you suppose the thing did?"

"Said, 'Pleased to meet you,' I'll bet!" suggested Harrison.

"I couldn't have been more surprised if it had! It drummed on its diaphragm, and then suddenly boomed out, 'We are v-r-riends!' and gave its pushcart a vicious poke at me! I jumped aside, and away it went while I stared dumbly after it.

"A MINUTE later another one came hurrying along. This one didn't pause, but simply drummed out, 'We are v-r-r-riends!' and scurried by. How did it learn the phrase? Were all of the creatures in some sort of communication with each other? Were they all parts of some central organism? I don't know, though I think Tweel does.

"Anyway, the creatures went sailing past us, every one greeting us with the same statement. It got to be funny; I never thought to find so many friends on this God-forsaken ball! Finally I made a puzzled gesture to Tweel; I guess he understood, for he said, 'One-one-two — yes! — two-two-four— no!' Get it?"

"Sure," said Harrison. "It's a Martian nursery rhyme."

"Yeah! Well, I was getting used to Tweel's symbolism, and I figured it out this way. 'One-one-two—yes!' The creatures were intelligent. 'Two-two-four—no!'—their intelligence was not of our order, but something different and beyond the logic of two and two is four. Maybe I missed his meaning. Perhaps he meant that their minds were of low degree, able to figure out the simple things—'One-one-two—yes,!' but not more difficult things—'Two-two-four—no!' But I think from what we saw later that he meant the other.

"After a few moments, the creatures came rushing back—first one, then another. Their pushcarts were full of stones, sand, chunks of rubbery plants, and such rubbish as that. They droned out their friendly greeting,

(Continued on page 122)

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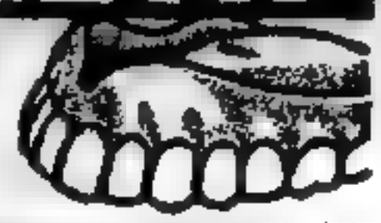

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(Continued from page 121)

which didn't really sound so friendly, and dashed on. The third one I assume to be my first acquaintance and I decided to have another chat with him. I stepped into his path again and waited.

"Up he came, booming out his 'We are v-r-r-riends' and stopped. I looked at him; four or five of his eyes looked at me. He tried his password again and gave a shove on his cart, but I stood firm. And then the —the dashed creature reached out one of his arms, and two finger-like nippers tweaked my nose!"

"Haw!" roared Harrison. "Maybe the things have a sense of beauty!"

"Laugh!" grumbled Jarvis. "I'd already had a nasty bump and a mean frost-bite on that nose. Anyway, I yelled 'Ouch' and jumped aside and the creature dashed away; but from then on, their greeting was 'We are v-r-r-riends! Ouch!' Queer beasts!

"Tweel and I followed the road squarely up to the nearest mound. The creatures were coming and going, paying us not the slightest attention, fetching their loads of rubbish. The road simply dived into an opening, and slanted down like an old mine, and in and out darted the barrel-people, greeting us with their eternal phrase.

"I looked in; there was a light somewhere below. I was curious, so in I went and Tweel tagged along, not without a few trills and twitters, however.

"The light was curious; it sputtered and flared like an old arc light, but came from a single black rod set in the wall of the corridor. It was electric, beyond doubt. The creatures were fairly civilized, apparently.

"Then I saw another light shining on something that glittered and I went on to look at that, but it was only a heap of shiny sand. I turned toward the entrance to leave, and the Devil take me if the entrance wasn't gone!

"I suppose the corridor had curved, or I'd stepped into a side passage. Anyway, I walked back in the direction I thought we'd come, and all I saw was more dim-lit corridor. The place was a labyrinth! There was nothing but twisting passages running every way, lit by occasional lights, and now and then a creature running by, sometimes with a pushcart, sometimes without.

"Well, I wasn't much worried at first. Tweel and I had only come a few steps from the entrance. But every move we made after that seemed to get us in deeper. I dumped my water tank on the floor and sat down.

"Tweel was as lost as I. I pointed up and he said, 'No—no—no!' in a sort of helpless trill. And we couldn't get any help from the natives; they paid us no attention at all, except to assure us they were friends—ouch!

"Lord! I don't know how many hours or days we wandered around there! I slept twice from sheer exhaustion; Tweel never seemed to need sleep.

"We saw plenty of strange things. There were machines running in some of the cor-

ridors, but they didn't seem to be doing anything—just wheels turning. And several times I saw two barrel-beasts with a little one growing between them, joined to both."

"PARTHENOGENESIS!" exulted Leroy. "Parthenogenesis by budding-like *les tulipes!*"

"If you say so, Frenchy," agreed Jarvis. "The things never noticed us at all, except, as I say, to greet us with 'We are v-r-r-riends! Ouch!' They seemed to have no home-life of any sort, but just scurried around with their pushcarts, bringing in rubbish. And finally I discovered what they did with it.

"We'd had a little luck with a corridor, one that slanted upwards for a great distance. I was feeling that we ought to be close to the surface when suddenly the passage debouched into a domed chamber, the only one we'd seen. And man, I felt like dancing when I saw what looked like daylight through a crevice in the roof.

"There was a sort of machine in the chamber, just an enormous wheel that turned slowly, and one of the creatures was in the act of dumping his rubbish below it. The wheel ground it with a crunch—sand, stones, plants, all into powder that sifted away somewhere. While we watched, others filed in, repeating the process, and that seemed to be all. No rhyme or reason to the whole thing—but that's characteristic of this crazy planet. And there was another fact that's almost too bizarre to believe.

"One of the creatures, having dumped his load, pushed his cart aside with a crash and calmly shoved himself under the wheel! I watched him crushed, too stupefied to make a sound, and a moment later, another followed him! They were perfectly methodical about it, too; one of the cartless creatures took the abandoned pushcart.

"Tweel didn't seem surprised; I pointed out the next suicide to him, and he just gave the most human-like shrug imaginable, as much as to say, 'What can I do about it?' He must have known more or less about these creatures.

"Then I saw something else. There was something beyond the wheel, something shining on a sort of low pedestal. I walked over; there was a little crystal about the size of an egg, fluorescing to beat Tophet. The light from it stung my hands and face, almost like a static discharge, and then I noticed another funny thing. Remember that wart I had on my left thumb? Look!"

Jarvis extended his hand.

"It dried up and fell off—just like that! And my abused nose—say, the pain went out of it like magic! The thing had the property of hard X-rays or gamma radiations, only more so; it destroyed diseased tissue and left healthy tissue unharmed!

"I was thinking what a present that'd be to take back to Mother Earth when a lot of racket interrupted. We dashed back to the other side of the wheel in time to see one of

(Continued on page 124)

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(Continued from page 123).

the pushcarts ground up. Some suicide had been careless, it seems.

"Then suddenly the creatures were booming and drumming all around us and their noise was decidedly menacing. A crowd of them advanced toward us; we backed out of what I thought was the passage we'd entered by, and they came rumbling after us, some pushing carts and some not. Crazy brutes! There was a whole chorus of 'We are v-r-r-riends! Ouch!' I didn't like the 'ouch,' it was rather suggestive.

"Tweel had his glass gun out and I dumped my water tank for greater freedom and got mine. We backed up the corridor with the barrel-beasts following — about twenty of them. Queer thing—the ones coming in with loaded carts moved past us inches away without a sign.

"Tweel must have noticed that. Suddenly, he snatched out that glowing coal cigar-lighter of his and touched a cart-load of plant limbs. Puff! The whole load was burning—and the crazy beast pushing it went right along without a change of pace! It created some disturbance among our 'v-r-r-riends', however—and then I noticed the smoke eddying and swirling past us, and sure enough, there was the entrance!

"I grabbed Tweel and out we dashed and after us our twenty pursuers. The daylight felt like Heaven, though I saw at first glance that the sun was all but set, and that was bad, since I couldn't live outside my thermo-skin bag in a Martian night—at least, without a fire.

"And things got worse in a hurry. They cornered us in an angle between two mounds, and there we stood. I hadn't fired nor had Tweel; there wasn't any use in irritating the brutes. They stopped a little distance away and began their booming about friendship and ouches.

"Then things got still worse! A barrel-brute came out with a pushcart and they all grabbed into it and came out with handfuls of foot-long copper darts—and suddenly there was a thunderous booming of 'v-r-r-riends' and 'ouches,' and a whole army of 'em came out of their hole.

"MAN! We were through and I knew it! Then I realized that Tweel wasn't. He could have leaped the mound behind us as easily as not. He was staying for me!

"Say, I could have cried if there'd been time! I'd liked Tweel from the first, but whether I'd have had gratitude to do what he was doing—suppose I had saved him from the first dream-beast—he'd done as much for me, hadn't he? I grabbed his arm, and said, 'Tweel,' and pointed up and he understood. He said, 'No—no—no, Tick!' and popped away with his glass pistol.

"What could I do? I'd be a goner anyway when the sun set, but I couldn't explain that to him. I said: 'Thanks, Tweel. You're a man!' and felt that I wasn't paying him any compliment at all. A man! There are

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mighty few men who'd do that.

"So I went 'bang' with my gun and Tweel went 'puff' with his, and the barrels were throwing darts and getting ready to rush us, and booming about being friends. I had given up hope. Then suddenly an angel dropped right down from Heaven in the shape of Schatz, with his under-jets blasting the barrels into very small pieces!

"Wow! I let out a yell and dashed for the rocket; Schatz opened the door and in I went, laughing and crying and shouting! It was a moment or so before I remembered Tweel; I looked around in time to see him rising in one of his nosedives over the mound and away.

"I had a devil of a job arguing Schatz into following! By the time we got the rocket aloft, darkness was down; you know how it comes here—like turning off a light. We sailed out over the desert and put down once or twice. I yelled, 'Tweel!' and yelled it a hundred times, I guess. We couldn't find him; he could travel like the wind and all I got—or else I imagined it—was a faint trilling twittering drifting out of the south. He'd gone, and damn it, I wish—I wish he hadn't!"

The four men of the Ares were silent—even the sardonic Harrison. At last little Leroy broke the stillness.

"I should like to see," he murmured.

"Yeah," said Harrison. "And the wart-cure. Too bad you missed that; it might be the cancer cure they've been hunting for a century and a half."

"Oh, that!" muttered Jarvis gloomily. "That's what started the fight!" He drew a glistening object from his pocket.

"Here it is."

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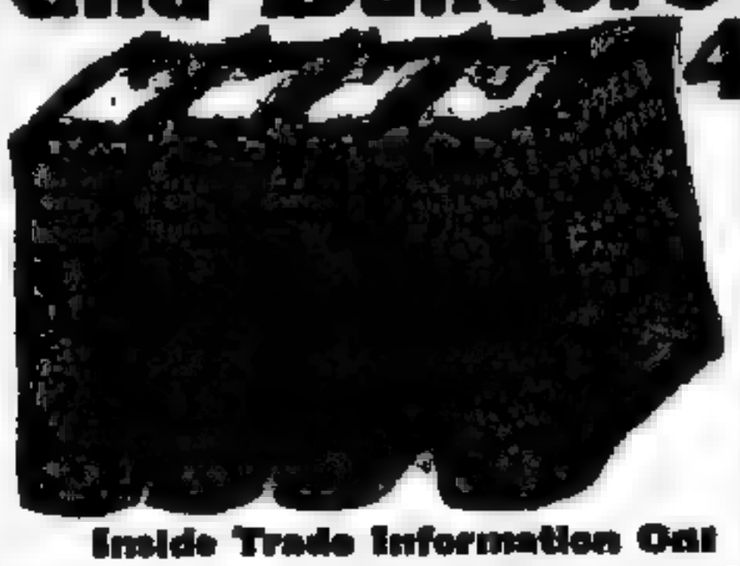

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REVIEW OF THE SCIENCE FICTION FAN PUBLICATIONS

NEW FANDOM. 603 So. 11th St., Newark, New Jersey. Edited by Sam Moskowitz, William S. Sykora, Mario Racic, James V. Taurasi, and Ray Van Houten.

Standout feature in July issue of this mimeographed mag is Thomas S. Gardner's breezy article, "Famous Characters of Science Fiction." Gardner classifies fantasy characters into five groups, and his comments are interesting. All departments and fan features quite up to par. Silk screen cover okay.

* * *

AD ASTRA. 3156 Cambridge Ave., Chicago, Ill. Edited by Mark Reinsberg, W. Lawrence Hamling, Henry Bott, Julian S. Krupa and Richard I. Meyer.

Don't miss Clifford D. Simak's plaintive wail, "Where's Hawk Carse?" in this issue. This issue in general a good job, with special contribs by Jack Williamson, Harry Warner, Jr., and others. Good adult tempo to this sheet. Illustrations rather distinctive. Also, interviews, editorials, verse and departments.

* * *

SPACEWAYS. 303 Bryan Place, Hagerstown, Maryland. Edited by James Avery and Harry Warner, Jr.

Seventh issue of this fantasy fan mag crammed with chatter anent the professional magazines, national authors, etc. Rather up-to-the-minute stuff, too. Varied table of contents includes fiction, verse, articles and departments by Robert W. Lowndes, Leslie F. Stone, J. Michael Rosenblum, Dale Hart, Bob Tucker, and other regulars. Book reviews, and a nostalgic commentary on the fantasy fiction of yesteryear are two of the highlights in this number.

* * *

SCIENCE FICTION FAN. Edited by Olon F. Wiggins, 2251 Welton St., Denver, Colorado.

An interesting article on the several books of John Taine, with brief synopses, is one of the brighter features in latest issue of this bulletin. Ralph Milne Farley appears with a contrib, "Stfiana," worth perusal. Third anniversary issue coming up with next number!

* * *

SCIENCE FANTASY REVIEW. 14 Henley Ave., Litherland, Liverpool 21, England. Edited by L. V. Heald, A. Bloom, J. F. Burke, Ron Holmes, E. G. Ducker, L. I. Johnson and E. L. Gabrielson.

A new publication, but a go-getter. Editor and his scouts survey the English fantasy field, cull all the news of British fantasy doings, and present the stuff in attractive form. For an overseas dish, give this the once-over. Journal is lively, with more than half an eye perked at who's who and what's what in American s-f.

* * *

FANTASY NEWS. 137-07 32nd Ave., Flushing, N. Y. Edited by James V. Taurasi, John Giunta, Sam Moskowitz and Mario Racic, Jr.

The lads have gone to town with the First Anniversary Issue of this gazette! Cover by Paul, with s-f articles (about a dozen) by leading authors, editors and fans in field. This issue a "must" on your list, if you're a collector of the best that the fan mags have to offer. Fan-

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THE SATELLITE. 57 Beauclair Drive, Liverpool 15, England. Edited by John F. Burke, David McIlwain.

Interesting letter by Robert D. Swisher, of U.S.A., tops issue. Ted Carnell's report of the London Science Fiction Convention also published in this issue. Pleasant air to this mag, although it could use some more wordage.

* * *

FUTURIA FANTASIA. 1841 S. Manhattan Pl., Los Angeles, Calif. Edited by Ray D. Bradbury.

Technocracy's the theme of this new pub. Ron Reynolds and F. J. Ackerman contribute pieces of fan phases. Next issue looks good. We're waiting.

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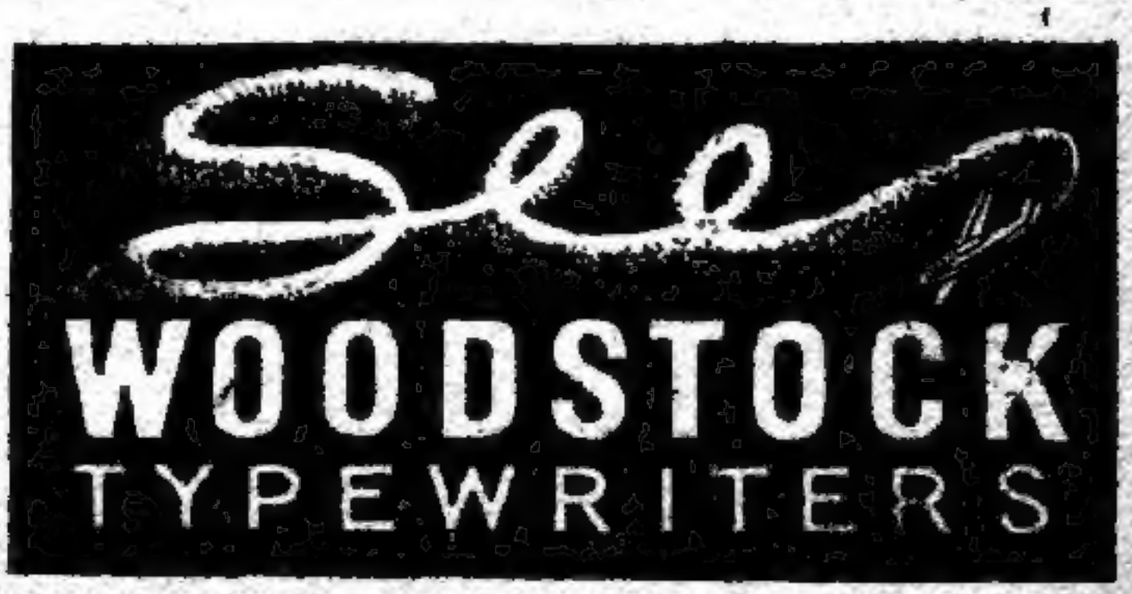

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THRILLS IN SCIENCE

(Concluded from page 105)

was functioning perfectly. Yet there was no ether-lag! And since theory demanded—as the honored Lorentz himself had calculated—that there must be a lag, Michelson had failed! His apparatus was so much junk. He had raced with light and lost.

Bitter moment! He turned away from the instruments with sagging shoulders. He had failed, and he had taxed his inventive powers to the utmost. No use trying to make a better apparatus. The weary lines of his face suddenly changed to crinkles of determination. Why must HE be wrong? Why not place the blame on theory?

"Morley!" he half shouted. "We're going to announce that there actually IS no ether-drag. Theory is wrong. We're right!"

It was a daring statement for Michelson to make, armed as he was with his unproved apparatus. The American was the laughing stock of science. But Michelson had many staunch admirers, too. And these men agreed with him. Since the Michelson-Morley experiment had shown no ether-drag, there simply was no ether-drag!

Turmoil arose in the world of science. The whole structure of physical theory threatened to collapse. The cry went up that the overconfident American had failed, just as everyone had expected. He had deluded himself in thinking he could match nature's speed records with man's clumsy engines.

For ten long, heart-breaking years Michelson's results were pigeon-holed as faulty. He stood by the sidelines, waiting hopefully for the theoreticians to change their sentence on him. He couldn't be wrong. He had checked his apparatus and principles a hundred times. Was he never to know vindication for his hard labors?

But eventually other experimenters tried to measure the ether-drift, in various ways. None succeeded. Were they ALL bad technicians? Or—the thought bit deeper like a strong acid—WAS ORTHODOX THEORY WRONG?

In desperation, a new theory was whipped into shape. The profound Lorentz himself devised, with a colleague, the famous Lorentz-Fitzgerald Contraction Theory, stating that objects contracted in the direction of motion. And Michelson was told, in the manner of parents informing a little child, that all the while his very instruments had physically shortened and changed. Imperceptible, trifling changes, but sufficient to make them worthless for the super-delicate work required of them. It was indirect reproof. Why hadn't the so-clever American noticed that simple fact?

Michelson tasted the bitterness of that explanation. It meant that his whole experiment was useless from the start! True, he had forced the lordly theorists to revise their ideas, but they still claimed there WAS an ether-drift that the daring American could never detect, with all his ability. Michelson couldn't swallow that. By all the stars in heaven, there was no ether-drag!

BEST FUN, FICTION AND FOTOS IN
128

Eighteen years later, 1905.

Einstein—relativity. A complete new visualization of the universe, much more plausible than any offered before. Einstein, too, said there was no ether-drag. Light had a uniform, unchangeable speed, regardless of motion. Because all motion was relative! And Einstein credited all inspiration for his great new theory at the doorstep of the Michelson-Morley experiment.

The American who had dared to run a race with unbeatable light had at least come out a tie! And he had placed the cornerstone of all modern theory of the entire universe.

SCIENCE QUESTION BOX

(Concluded from page 113)

There's yet one other important handicap which puts our present insect pygmies behind the scientific eight-ball. Animal activity, intelligent or otherwise, always depends upon the working of nerve cells. Stereotyped action, no matter how marvelous it may seem, can be accomplished by a few nerve cells properly hooked together. But intelligence, reason, ability to choose—the very essence of brain power—require millions of nerve cells and interconnecting paths. The tiny insect simply hasn't got place for these!

Insects outnumber mammals a hundred to one as to kind. They can outspeed them, produce faster, and develop perfectly organized social societies, survive wherever mammals can, but they remain insects forever. The contest between the insects and the mammals was decided millions of years ago when nature decreed that insects should breathe only through the medium of tubes.—Ed.

SYNTHETIC PEARLS

Editor, SCIENCE QUESTION BOX:

How can scientists tell the difference between natural and cultured pearls?—L. O. B., Kansas City, Kansas.

Very simply—by the use of X-rays. For the past 15 years the X-ray has been used to differentiate natural from cultured pearls. If the gem is natural, a uniform scattering of the X-rays takes place when they impinge on the specimen, producing a six- or twelve-fold "spot" pattern. A cultured pearl, similarly tested, on the other hand, will usually produce a maltese-cross pattern.—Ed.

Solution to Puzzle (See Page 116)

		N	O	V	A		I	R	I	S	
A	C	I	D		R	U	N		D	A	M	P
R	A	T		I	C		V	O		C	O	L
C	L		A	S	H	L	E	R	S		L	Y
		P	U	M	A		R	E	A	L		
B	E	A	K		E	A	T		P	A	L	P
D	E	W		R	O		E	O		P	E	A
S	L		C	A	P	A	B	L	E		A	N
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A	L	U	M		E	R	A		R	U	S	T
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29x4.75-20	2.50	1.25
29x5.00-19	2.35	1.25
30x5.00-20	2.50	1.35
6.25-17	2.50	1.45
28x5.25-18	2.50	1.35
29x5.25-19	2.55	1.35
30x5.25-20	2.60	1.35
31x5.25-21	2.75	1.35
5.50-17	2.75	1.40
28x5.50-19	2.75	1.40
29x5.50-19	2.85	1.45
6.00-17	2.90	1.40
30x6.00-18	2.90	1.40
31x6.00-19	2.90	1.45
32x6.00-20	2.95	1.45
33x6.00-21	2.95	1.45
32x6.50-20	2.75	1.75
6.00-16	2.75	1.45

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30x3½	$2.29	$0.95	32x4½	$3.45	$1.45
31x4	2.95	1.25	34x4½	3.45	1.45
32x4	2.95	1.25	30x5	3.65	1.65
33x4	2.95	1.25	33x5	3.75	1.75
34x4	2.29	1.35	35x5	3.95	1.75
32x4½	3.35	1.45			

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34x6	4.25	2.25	36x8	11.45	4.95
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34x6	6.95	4.45			

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6.50-20	4.45	1.95	8.25-20	8.95	4.95
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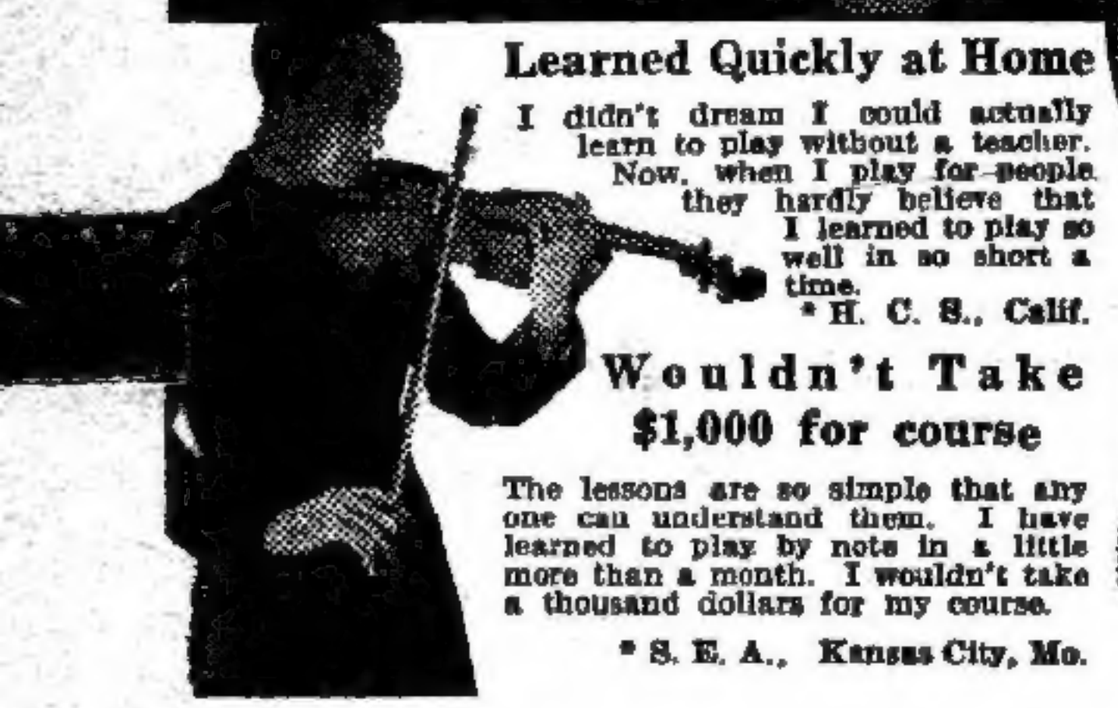

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